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PUBLICATION NOTE

By a change in the By-Laws of the Biological Society of Washington, effective March 27, 1926, the fiscal year now begins in May, and the officers will henceforth hold office May to May. This, however, will make no change in the volumes of the Proceedings, which will continue to coincide with the calendar year. In order to furnish desired information, the title page of the current volume and the list of newly elected officers and committees will hereafter be published soon after the annual election in May.

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Errata

In the paper by Donald F. Hoffmeister and Luis de la Torre, Two New Subspecies of *Peromyscus difficilis* from Mexico, the last two lines on page 167 and the first line on 168 should be the fourth, fifth and sixth lines of paragraph 2, page 168.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS

The two meetings during 1959 were held in Room 43 of the United States National Museum.

1027th Meeting — May 25, 1959

EIGHTIETH ANNUAL MEETING

President Owens in the chair; 21 members present.

The reports of the Recording Secretary, Corresponding Secretary, Treasurer, Committee on Publications, and Committe on Communications were presented.

The following officers and members of council were elected: President, Howard B. Owens; Vice Presidents, D. H. Johnson, A. C. Smith, C. F. W. Muesebeck, and Allen J. Duvall; Recording Secretary, S. F. Blake; Corresponding Secretary, John L. Paradiso; Treasurer, B. R. Feinstein; Members of Council, J. P. E. Morrison, V. S. Schantz, L. M. Russell, and C. O. Handley, Jr.

The business meeting was followed by two papers, as follows: Dr. R. J. Downs, of the Pioneering Laboratory in Plant Physiology, U. S. Dept. Agriculture, spoke on recent developments in the control of germination, growth, and flowering of plants by low intensity light. Dr. T. E. Hinton, of the Farm Electrification Research Laboratory, U. S. Dept. Agriculture, spoke on current research on various attractants to economically important insects.

1028th Meeting — December 11, 1959

President Owens in the chair; 32 members present.

New members elected: Walter C. Brown, R. E. Crabill, Jr., W. T. Keeton, Jr., L. M. Smith, T. J. Spillman, and H. E. Vible.

Dr. Blake exhibited some lichens from the Near East which he thought might be connected with the "manna" of the Biblical story of the Exodus.

Formal Communication: Dr. C. O. Handley, Jr., U. S. National Museum: Experiences in collecting mammals in the Republic of Panama.

Vol. 72, pp. 1-4 April 7, 1959

PROCEEDINGS
OF THE
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THE SCIENTIFIC NAMES OF THE SPECIES OF CAPUCHIN MONKEYS (*Cebus* Erxleben).

By PHILIP HERSHKOVITZ
Curator of Mammals, Chicago Natural History Museum

The correct scientific name for each of the four recognized species of capuchin monkeys is (1) *Cebus apella* Linnaeus, 1758, for the tufted (or crested) capuchin; (2) *Cebus capucinus* Linnaeus 1758, for the black white-fronted capuchin; (3) *Cebus albifrons* Humboldt, 1812, for the brown pale-fronted capuchin; (4) *Cebus nigrivittatus* Wagner, 1848, for the brown, dark-limbed capuchin with the small wedge-shaped cap. It appears that the first three names are now firmly established. The validity of the fourth, *Cebus nigrivittatus,* however, has been questioned in recent years, most lately by Hill (1958:316).

The first attempt to nullify the name *nigrivittatus* Wagner as employed in my (1949) review of the genus *Cebus,* was made by Tate (1954:415). This authority argued that the name *Cebus apella* should have been used instead for the brown untufted capuchin with wedge-shaped cap. This identification was shown to be erroneous (Hershkovitz, 1955:449), and it is doubtful that anyone now seriously believes that *Cebus apella* is anything but the tufted species of *Cebus.*

The next effort to invalidate the name *Cebus nigrivittatus* was made by Husson (1957). According to my esteemed colleague, the name had been secondarily homonymized with that of a squirrel monkey, *Chrysothrix nigrivittatus* Wagner, by Pusch (1941:145), hence must be permanently suppressed. This concept of the status of secondary homonyms was disputed by me in 1949 (pp. 345, 368, 417-418) and again in 1958 (1958a: 54; 1958b:1242) and is repudiated in the as yet unpublished London (1958) draft of the International Rules of Zoological Nomenclature.

The latest pronouncement on the subject is by Hill (1958:318) who decided "that the scientific name of the Weeper Capuchin [i.e. *Cebus nigrivittatus*] should correctly be *Cebus griseus* F. Cuvier 1824 (1819)" Judged by the framing of his reference Hill based his proposition solely on a misinterpretation of a condensed citation worded "*sajou mâle,* Cuvier, 1824, livr. 12, pl., November 1819 (*Cebus griseus* F. Cuvier)" in my (1949:347-348) synoptic synonymy of Cebus *nigrivittatus.* In the *Histoire Naturelle des Mammifères* by E. Geoffroy St.-Hilaire and F. Cuvier (1818-1842) where the names in question first appear, the *sajou* *mâle* is described and figured in *livraison* 12 under its vernacular name only. The *livraison* was separately published and issued in 1819. It was then bound with 19 other *livraisons* to form the first of seven volumes and dated 1824. It is not until the end of volume 7, on page 2 of the *Table générale et méthodique de toutes les espèces figurées et décrites dans l'Histoire Naturelle des Mammifères,* that the technical name *Cebus griseus* for the *sajou mâle* appears for the first time. The *Table* was separately issued some time after the publication of the final (67th) *livraison* in April 1833. Volume 7 itself is dated 1842, and this is the date taken for all technical names for animals described in the various *livraisons* under vernacular names only. It is also to be noted that the *Table* and all other indices of the *Histoire Naturelle des Mammifères* were compiled and published by the son of Frédéric Cuvier after the death of his father in 1838. Thus, the first technical name based on the *sajou mâle* F. Cuvier, 1819, is *Cebus griseus* F. Cuvier, *fils,* 1842.

As happens so often, the belated appearance of the *Table* permitted other authors to publish names which anticipated or preoccupied practically all those proposed by F. Cuvier, *fils.* Thus *Cebus griseus* F. Cuvier, *fils,* 1842, for the *sajou mâle,* is invalidated by *Cebus griseus* Desmarest, 1820, based primarily on the *sajou gris* of Buffon (1767). This last has been positively identified as a tufted capuchin equal to *Cebus apella* Linnaeus (cf. Hershkovitz, 1949:339, 340 and footnote 1). It is true that Desmarest referred the *sajou mâle* of Cuvier to his *Cebus griseus,* but ''*avec doute*'' (p. 82) and only as a ''variété.'' Under no consideration can Cuvier's *sajou mâle* be treated as a type of *Cebus griseus* Desmarest.

Another capuchin with a comparable history is described by F. Cuvier in *livraison* 51, published September 1825, under the heading *sajou à pieds dorés, ou chrysope.* At the end of the article, Cuvier suggests that ''*le nom chrysopes pourra servir à le désigner dans les catalogues méthodiques.*'' Nowhere in the text is the combination of *chrysopes* with a definite generic name either used or implied. The first valid name, i.e. binomial, for the *chrysope* is *Cebus chrysopus,* proposed by Lesson in 1827. F. Cuvier, *fils* used exactly the same technical name in the *Table* of 1842. Like his translation of *chrysopes* or *pieds dorés,* as ''golden-handed,'' I cannot follow Hill's (1955:54) use of *chrysopes* [sic] as a technical name in combination with *Cebus* dated from Cuvier, 1825, or his reasons for the identification of a mounted specimen without data in the Royal Scottish Museum, with the *sajou a pieds dorés* of F. Cuvier.

All evidence, viewed in the light of taxonomic principles and rules of nomenclature, requires that the name for the dark brown untufted capuchin with the small triangular or wedge-shaped cap remain *Cebus nigrivittatus* Wagner, 1848.

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1957 Notes on the Primates of Suriname. Studies of the Fauna of Suriname and other Guayanas, **1,** (2):1-40, pls. 1-8.

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Pusch, B.

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Tate, G. H. H.

1954 On *Cebus apella* (Linnaeus) with a note on *Cebus capucinus* (Linnaeus). Jour. Mammal., **35**:415-418.

Vol. 72, pp. 5-10 April 7, 1959

PROCEEDINGS
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TWO NEW GENERA OF SOUTH AMERICAN RODENTS (CRICETINAE)

By Philip Hershkovitz
Curator, Division of Mammals

Descriptions of the following genera are based on specimens preserved in the British Museum (Natural History) and in the Chicago Natural History Museum.

Thanks are expressed to the authorities of the British Museum for permission to study the collection of mammals in their charge and for the many courtesies shown me.

Examination of material in the British Museum was made possible by a grant from the National Science Foundation.

WIEDOMYS (new genus)

Type species—Mus pyrrhorhinos Wied-Neuwied.

Characters.—A small, scansorial, red-nosed, red-eared, red-rumped mouse; tail about two-thirds total length, fifth hind toe nearly as long as fourth, claws short and recurved; skull with unexpanded zygomatic arches, non projecting anterior zygomatic plate, divergent sided and ridged supra-orbital region well developed interparietal, greatly inflated bullae, long incisive foramina, long and wide bony palate; incisors unspecialized, molars bunobrachyodont, with mesoloph obsolescent. mesolophid absent, anterior median fold well defined in upper and lower first molars.

Remarks.—This monotypic genus is named in honor of Prince Maximilian zu Wied-Neuwied, the discoverer of the type species and one of the great naturalist-travelers of the nineteenth century.

The following description of *Wiedomys* and comparisons with other forms are made in terms of its type and only known species. For explanations of cranial and dental terms, see Hershkovitz (1959, Fieldiana, in press).

Wiedomys pyrrhorhinos Wied-Neuwied

Mus pyrrhorhinos Wied-Neuwied, 1821, Reise nach Brasilien, **2**:177 footnote). Schinz, 1821, Cuvier Das Thierreich. **1**:228—BRAZIL: Bahía.

Mus pyrrhorhinus [sic], Wied-Neuwied, 1823, Abbild. Naturg. Brasil., Lief. 3, pl. 2 (animal). Lund, 1841, Afh. Vid. Danske Selsk. Nat. Math., **8**:276—BRAZIL: Lagôa Santa, Minas Gerais. Lesson, 1842, Nouv. Tabl., Reg. Anim., p. 142. Goodwin, 1953, Bull. Amer. Mus. Nat. Hist., **102**:300—type history.

M[*us*] *pyrrhorhinus* [sic], Wied-Neuwied, 1826, Beitr. Naturg. Brasil., **2**:418—BRAZIL: Bahía; characters.

Hesperomys pyrrhorhinus [sic], Burmeister, 1854, Syst. Uebers. Thiere Brasil., **1**:172—BRAZIL: Sertong von Bahía. Thomas, 1886, Ann. Mag. Nat. Hist., (5), **18**:421—part, regarded as referrable to *Oryzomys*.

[?] *Oryzomys pyrrhorhinus* [sic], Bertoni, 1914, Descr. Fis. Econ. Paraguay, p. 73—PARAGUAY: Sina, Trinidad.

Oryzomys pyrrhorhinus [sic], Thomas, 1928, Ann. Mag. Nat. Hist., (10), **1**:155—BRAZIL: distribution (Ceará to Minas Gerais); characters; comparisons. Ellerman, 1941, Families and genera of living rodents, **2**:341, 342, 345, 349—characters; comparisons; relationships.

Orizomys [sic] *pyrrhorhinus* [sic], Moojen, 1943, Bol. Mus. Nac., Rio de Janeiro, Zool., no. 5:11—BRAZIL: Poção, Pernambuco; Ceará; Monte Alegre; habits.

[*Rhipidomys*] *pyrrhorhinus* [sic], Tate, 1932, Novit. Amer. Mus., no. 581:4, 5, 6, 19—taxonomic history.

[*Oecomys*] *pyrrhorhinus* [sic], Osgood, 1933, Journ. Mammal., **14**:370 BRAZIL: Ibiapaba, Piauhy; Lamarão. Bahía; characters; taxonomic history.

Thomasomys pyrrhorhinus, Moojen, 1952, Os roedores do Brasil, p. 61—BRAZIL: Ceará; Pernambuco; Paraiba do Norte; Barreira, Bahía; Minas Gerais; northern Mato Grosso; Paraná; Rio Grande do Sul; breeding and nesting.

Thomasomys pyrrhorhinus [sic], Vieira, 1955, Arq. Zool., São Paulo, **8**:413—listed.

Type.—Female, skin only (tail missing), mounted, American Museum of Natural History, no. 574; collected by Prince Maximilian zu Wied-Neuwied and acquired with the Maximilian collection.

Type locality.—"Riacho da Ressaque," i.e., Rio Ressaro, a small tributary of the Guaviao (which flows into the Rio Contas), southern Bahía, eastern Brazil.

Distribution.—Eastern Brazil, from the States of Piauhy and Ceará south into Rio Grande do Sul, west into Minas Gerais and, possibly, Mato Grosso and Paraguay.

External characters.—Size small, about equal to *Oryzomys bicolor* but head and tail proportionately longer; pelage long, loose, coarse; back mixed buffy and brown; sides buffy; nose, eye ring, preauricular tufts, inner and outer sides of ears, outer sides of fore and hind limbs, and rump bright reddish-orange in marked contrast with pale coloration of remainder of body; underparts sharply defined white; tail averaging two-thirds total length of animal, the fine scales not hidden by the hair, gray-brown above, somewhat paler beneath, pencil absent; hind feet buffy above, claws short, recurved and hidden by digital tufts; fifth hind toe, less claw, reaching end of second phalanx of fourth, first hind toe less claw, extending a short distance beyond base of second digit; plantar surface of heel hirsute, sole with six tubercles, the four postdigital tubercles enlarged; mammae, 1-2 = 6 (fide Wied-Neuwied).

Color of young like that of adult but with paler reddish-orange markings.

Cranial characters.—Sides of supraorbital region weakly ridged and divergent posteriorward; mid-transverse width of paired frontals more than greatest width of rostrum; nasals relatively short, not markedly tapered behind, the proximal tips rounded or truncate and approximately in line with fronto-maxillary sutures; anterior zygomatic plate more or less vertical in position and hardly visible when skull is viewed from directly above; antorbital foramen only slightly excised on dorsal surface; fronto-parietal suture crescentic; braincase moderately inflated, not vaulted; interparietal large; hamular process of squamosal long, slender and clearly defined by large temporal vacuities; incisive foramina well open and extending behind to plane between procingulum and protocone of first molar; palate between first molars slightly wider than alveolar length of m^1; posterolateral border of palatine extending well behind third molar and marked by one or two pits; mid-posterior palatal border sub-concave or V-shaped, the notch extending quite or slightly anteriad to posterior plane of third molars; width of mesopterygoid fossa at base of hamular processes less than width of parapterygoid fossa measured at same plane; paired hamular processes of pterygyoids parallel-sided; sphenopalatine vacuities large; bullae greatly inflated, depth of either bulla three times or more distance between both bullae measured along basioccipital suture; length of bulla, less tube, subequal to length of incisive foramina and greater than alveolar length of molar row; coronoid process short; capsule encasing posterior tip of lower incisor forming a ridge but not projecting as a blunt spinous process.

Dental characters.—Upper incisors opisthodont, ungrooved; molar rows parallel-sided; upper molars bunobrachyodont, the inner and outer cusps of equal height, crowns of lower molars bilevel, i.e., inner cusps crested, outer lower, but not plane; anteromedian fold of $m\frac{1}{1}$ well defined, procingulum of upper with two fully developed conules, the inner about one-half size of outer, procingulum of lower first molar with subequal conules; major fold widely trenchant, with enterostyle (id) present in first and second molars, an enteroloph (ectolophid) present in first molars; first minor folds present in all molars; second secondary folds absent in all but newly erupted $m\,\underline{1\text{-}2}$; mesoloph low and obsolescent, mesostyle present and fused with paralophule; mesolophid absent, mesostylid and/or entolophid present.

Systematic position and comparisons.—Obsolescence or absence of the mesolophostyle (id) separates *Wiedomys* from all oryzomyine and true peromyscine (including *Rhipidomys* and *Thomasomys*) rodents. The narrow mesopterygoid fossa, long wide palate with posterolateral palatine pits, well developed interparietal, simplified molar enamel pattern and special details of external structure place *Wiedomys* near such phyllotine genera as *Calomys* (=*Hesperomys*) and *Eligmodontia*. Wied's red-nosed mouse, however, is separated from all phyllotines by its color pattern, slight dorsal excision of the antorbital foramen and somewhat less specialized molars. It differs from the specialized vole-like and shrew-like mice composing the *Akodon*-group by color pattern, long tail, short, recurved claws, short rostrum, greatly inflated bullae, ridged supraorbital edges, fully developed interparietal and other characters of lesser note.

Externally, *Wiedomys pyrrhorhinos* is remarkably similar to the possibly sympatric *Thomasomys oenax* and has been confused with it (Thomas, 1886, Ann. Mag. Nat. Hist., [5], **18**:421). The latter is much larger with underparts not well defined from sides, the basal portions of the hairs dark gray, plantar surface of heel bare, supraorbital region parallel-sided and square, not ridged. Also, a functional mesolophostyle (id) is present in all species of *Thomasomys*. Wied's red-nosed mouse has also been treated as a *Rhipidomys* and as an *Oecomys*, a subgenus of *Oryzomys*. Resemblances between these small arboreal cricetines are parallelisms common to many climbing, tree nesting rodents, irrespective of ancestry. Ellerman (1941, Families and genera of living rodents, 2: 342, 349) classified *pyrrhorhinos* as a ''species group'' of *Oryzomys*. He pointed out, however, that the mouse was unlike any *Oryzomys* he had seen and that in a final revision it ''will prove to be the type of a very distinct group or probably subgenus.''

Habitat and habits.—The red-nosed mouse is an inhabitant of the scrub forests or *caatingas* of northeastern Brazil. Wied-Neuwied saw the animal, a female with five young, in an abandoned nest of a thorn bird, *Anabates rufifrons*. The nest of this bird, which may be from three to six feet long, is made of dry intertwined branches and attached to lianas. Moojen (1943, Bol. Mus. Nac., Zool., 1:11; 1952, Os roedores do Brasil, p. 62) also reports finding the mouse in old bird nests, including termite cartons previously excavated and occupied by parrots. In one such, A. L. Carvalho (in Moojen) counted 8 adults and 13 young of different sizes. Moojen adds that the mouse makes its own nest too, in stone walls, hollow trunks of trees, canopies of thick shrubs and low palms. Dry leaves, grass or cotton fibers are used in the construction. Up to six young, usually five, are produced in a litter. The mouse was observed to be an agile climber. According to Moojen, it is called *rato-de-fava* (bean rat) in Pernambuco, *rato-de-palmatorio* (palmatory rat) in Paraiba. Wied-Neuwied used the name *catinga-mouse* for the one he described from Bahía.

Measurements (in millimeters)—Of two adults, one from Lamarão, Bahía, the other from Ladeira Grande, Ceará: Head and body, 105, 100; tail, 160, 193; hind foot, dry (with claw), 25, 26; ear, from notch, 18, 20; greatest length of skull, 30.0, 29.7; zygomatic breadth, 14.4, 15.1; interorbital constriction, 4.7, 4.6; midfrontal breadth, 6.4, 6.0; greatest width of rostrum, 5.2, 5.2; nasals, 11.0, 10.4; braincase, 13.0, 12.8; interparietal, 4.0 × 10.4, 3.8 × 9.3; incisive foramina, 6.8, 6.6; diastema, 7.0, 7.1; width of zygomatic plate, 2.5, 2.5; length (less tube) and depth of bullae, 6.3 × 5.4, 6.4 × 5.3; alveolar length of molar row, 4.7, 4.7. Comparable measurements of the type, from the original description: Head and body, 117; tail, 202.

Specimens examined.—Three. Lamarão, Bahía, 1 (British Museum [Natural History]); Ladeira Grande, Ceará, 1 (British Museum [Natural History]); Ibiapaba, 1, juvenal (Chicago Natural History Museum).

PSEUDORYZOMYS (new genus)

Type species.—*Oryzomys wavrini* Thomas (1921, Ann. Mag. Nat. Hist. [9], **7**:177).

Characters.—The type and only known species of the genus resembles *Oryzomys palustris* in size, external appearance and, very probably, in habits. Cranial and dental characters of *wavrini*, however, prove it to be more nearly related to *Phyllotis* than to any oryzomyine. A monograph of the phyllotine rodents, including a fully documented account of the characters and systematic position of *Pseudoryzomys* will appear in a forthcoming number of Fieldiana.

Remarks.—In addition to the type of *Pseudoryzomys wavrini* from Jesematathla, Chaco Boreal, Paraguay, there is another specimen in the British Museum from Misión, Chaco Boreal, and a third, in the Chicago Natural History Museum, from Tacaagle, Rió Porteño, Formosa, Argentina.

A Note on *Rhipidomys macconelli* de Winton.

In comparing *Wiedomys pyrrhorhinos* (see above) with species of *Rhipidomys* and *Thomasomys* in the British Museum, it was found that the Mt. Roraima specimen originally described as *Rhipidomys macconelli* by de Winton (1900, Trans. Linn. Soc. London, [2], **8**:52) is correctly allocated to genus. It is a member of the *Rhipidomys latimanus* group and most nearly related to *R. fulviventer*. For no apparent reason, *R. macconelli* was transferred to *Thomasomys* by Thomas (1917, Ann. Mag. Nat. Hist., [8], **20**:195) where it has been kept by all subsequent compilers.

Vol. 72, pp. 11-12 April 7, 1959

PROCEEDINGS
OF THE
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DESCRIPTION OF THE APTEROUS FORM OF CINARA PINIVORA (W)

F. C. Hottes

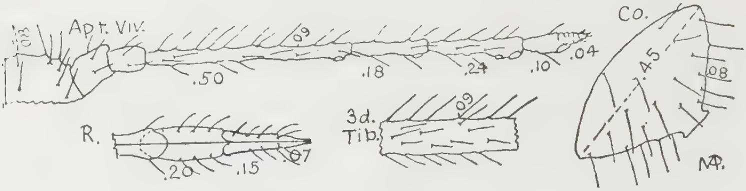
In 1919 Wilson described *Cinara pinivora* from alate viviparous females taken in New York. H. E. Milliron in 1957 took apterous viviparous females of this species which have been made available to me for description by the United States National Museum.

Cinara pinivora (Wilson)

Apterous viviparous female.

Size and general color.—Length from vertex to end of anal plate varying from 2.55 — 3.37 mm. Color of living specimens not recorded, as represented by cleared mounted specimens as follows: head and prothorax brown, dorsum of meso and metathorax with large pigmented areas, the area on the metathorax more or less divided in the middle. First antennal segment concolorous with head, second antennal segment not nearly so dark. Third fourth and fifth antennal segments pale with apical portions pale brownish, the brown being more extensive on the fifth. Sixth antennal segment brown. All femora pale on basal halves, shading to brownish at apex the brown being more extensive on the femora of the metathoracic legs. Tibiae brown near base, this followed by an extensive pale dusky region, which shades into brown about the middle, the pale area is more extensive on the pro and mesothoracic tibiae. All tarsal segments brown. Mid dorsal region of abdomen with two rows of irregular margined pigmented spots, arranged on a pale base, which has in addition a few small irregular pigmented spots, not in rows. Cornicles same color as pigmented areas in dorsum, cauda and anal plate only slightly darker.

Head and thorax.—Length of antennal segments as follows: III .49 — .51 mm., IV .18 mm., V .225 — .24 mm., VI .10 + .04 mm. Hair on antennal segments sparse, more numerous on anterior margin, varying in length on posterior margin from .045 — .06 mm. length on anterior margin .09 mm. Hair on antennal segments set at angle slightly more than forty five degrees, distinctly spinelike on anterior margin, finer on posterior margin. Pigmented regions on the fourth and fifth antennal segments very indistinctly imbricated. Sixth segment distinctly imbricated. Third antennal segment with from zero to one secondary sensoria, primary sensorium on this segment present or absent, when present small. Fourth antennal with only primary sensorium, fifth antennal segment with one secondary and primary sensoria. Marginal sensoria



Cinara pinivora (W)

extending by about one sensorium in either direction beyond primary. Width of head through the eyes .67 mm. Ocular tubercles small. Hairs on first and second antennal segments few, apparently arranged in two incomplete rows, on each segment. Hair on vertex and dorsum of head quite similar to hairs on anterior margin of third antennal segment, or slightly shorter. Hairs on dorsum of head failing to reach posterior margin of head, and not present directly adjacent to eyes. Median transverse suture of head brownish, rather narrow. Rostrum reaching mid region of cornicles. Hairs on dorsum of prothorax grouped into two transverse rows. Lengths of prothoracic femora and tibiae as follows: .755 — .90 mm., 1.03 — 1.20 mm. similar lengths for the metathoracic legs are 1.20 — 1.29, 1.95 — 2.22 mm. Hairs on anterior margin of metathoracic femora distinctly more spinelike than elsewhere, fewer and more upstanding towards base, almost procumbent near apex on anterior margin. Hairs on metathoracic tibiae, on the whole more numerous, shorter and less spinelike on the inner margin than on the outer. Hairs on outer margin of metathoracic tibiae about as long as width of tibiae or only very slightly shorter. Ventral surface of first metatarsal segment with about twelve hairs. Hairs on second metatarsal segment more numerous and longer on the dorsal region than on the ventral surface.

Abdomen.—Dorsum of abdomen except for pigmented areas reticulated. Hairs on dorsum of abdomen not numerous, some hairs arising from pigmented spots other than the large pigmented areas, for the most part these spots are lateral to the dorsal spots. For the most part the hairs on the dorsum are spaced farther apart than their length. Hairs on the ventral surface of the abdomen far more numerous and shorter than those on the dorsum. Cornicles with base measuring about .45mm. Outer margin of cornicles slightly irregular. Hairs on cornicles few, hardly more numerous on constricted region than elsewhere. In shape the cornicles are rather flat. Transverse pigmented areas anterior to cauda toothed on inner and outer margins, provided with a single row of hairs, the setulae on these areas are but poorly developed, they being much better developed on pigmented areas directly anterior, if such are present. Cauda and anal plate with dark setulae. Genital plate rather narrow, rounded anteriorly and deeply excavated on the posterior, provided with numerous hairs which cover most of surface.

Morphotype apterous viviparous female deposited in the United States National Museum. Redden State Forest, Del. Virginia pine (*Pinus virginiana*) May 1, 1957. Collected by H. E. Milliron on main branches.

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April 22, 1959
~~May 1, 1959~~

PROCEEDINGS
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A NEW SPECIES OF SCHIZOLACHNUS (Aphidae)

F. C. Hottes

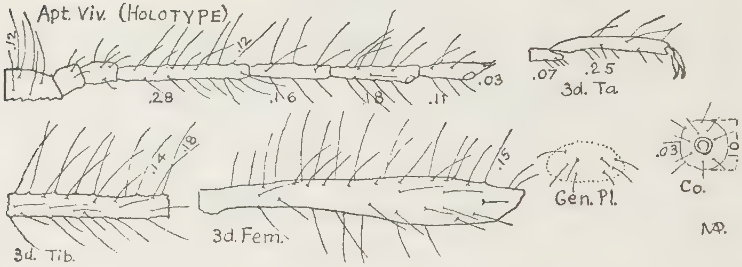
Miss Louise M. Russell of the United States National Museum sent me the material taken by H. E. Milliron from which this new species is described. I express my appreciation to both of them.

Schizolachnus lanosus n. sp.

Apterous viviparous female.

Size and general color.—Length from vertex to end of cauda about 1.62 mm. Color in life not recorded, but specimens, described as being flocculent, as represented by cleared mounted specimens as follows: head with vertex and median portion of dorsum pale brownish, lateral portions and posterior margin of head pale. First and second antennal segments pale brownish. Third and fourth antennal segments pale with apical areas tinged slightly darker. Fifth and sixth antennal segments uniform pale brownish. Pro and mesothoracic femora with extreme base pale, remainder a uniform brown. Metathoracic femora with pale area near base longer than pale area on anterior femora, remainder of segments brownish. Pro and mesothoracic tibiae pale brownish with proximal and distal regions tinged darker. Metathoracic tibiae a uniform pale brownish. Tarsal segments similar to ends of tibiae. Dorsum of abdomen without pigmented areas. Cornicles pale brownish.

Head and thorax.—Lenth of antennal segments as follows: III .28 — .285 mm., IV .16 — .165 mm., V .165 — .18 mm., VI .11 + .03 mm. The only sensoria present are the primary on the fifth and sixth segments, these have wide rims. Marginal sensoria on sixth segment absent. Sixth antennal segment very, very faintly imbricated. Hair on antennal segments few, on third antennal segment longer and more upstanding on anterior margin, on this margin the hairs vary in length from .09 — .12 mm. Hairs on dorsum of head few, about .12 mm. in length, limited to mid dorsal region, not reaching vicinity of eyes or posterior margin. Hairs on first antennal segment shorter than hairs on second antennal segment. Rostrum reaching mid region of mesothoracic coxae. Lengths of prothoracic femora and tibiae .375 and .465 mm. Lengths of metathoracic femora and tibiae .69 and .98 mm. Lengths of metatarsal segments .07 and .25 mm. Hairs on femora not numerous. upstanding, on metathoracic femora reaching a length of .15 mm. on this segment the hairs are slightly more numerous on the anterior margin. Hairs on metathoracic tibiae not numerous, fine, upstanding, slightly more upstanding on outer margin, where they vary in length from .14 —



Schizolachnus lanosus

.18 mm. Ventral surface of first metatarsal segment with about five short hairs near the apex. Hairs on dorsum of second metatarsal segment very few, very long and fine. Hairs on ventral surface of second metatarsal segment much shorter than the hairs on the dorsum.

Abdomen.—Hairs on dorsum of abdomen sparse, fine, about .12 mm. in length, more numerous on ventral surface, but shorter, finer and more variable in length on this surface. Cornicles shallow cones, with the base measuring about .10 mm. Hairs on cornicles fine, short and few in number. Cauda and anal plate with surfaces very finely setulose. Hairs limited to posterior margins, few in number. Cauda almost as long as wide at the base. Genital plate small in size, in shape a broad oval, provided with few hairs at the ends.

This species keys, but not without question to *Schizolachnus pineti* (*F*) in my key to species, Proceedings Biological Society of Washington 1956. The hind tibiae are not thick, the tarsal segments are not of the same length, the hairs on the antennae, femora and tibiae far too few.

Holotype, apterous viviparous female, deposited in the United States National Museum. Taken on the needles of *Pinus virginiana* Petersburg, Del. July 3, 1957 by H. E. Milliron.

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PROCEEDINGS
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TWO NEW SUBSPECIES OF BIRDS FROM WESTERN NORTH AMERICA

By Thomas D. Burleigh

In the course of studying collections taken in connection with the investigation of birds in the Northwest it became apparent that two resident species, the Chestnut-backed Chickadee and the Winter Wren, represented distinct and undescribed races. These are as follows:

Parus rufescens caliginosus new subspecies

Characters.—Similar to *Parus rufescens rufescens* but darker; pileum and hindneck clove brown rather than sepia brown, back, scapulars and rump dark chestnut; sides and flanks likewise dark chestnut; chin, throat, and upper part of chest so dark brown as to be almost black, and lacking the reddish tinge characteristic of *rufescens.* There is no appreciable size difference.

Measurements.—Adult male – wing 60-64.5(62.3); tail 47.5-52(50); exposed culmen 8-10(9). Adult female – wing 54.5-59(57.3); tail 44-48 (46); exposed culmen 7.5-10(8.8).

Type.—Adult male No. 394631, United States National Museum (Fish and Wildlife Service collection), 20 miles northeast of Moscow, Latah County, Idaho, June 14, 1947; David W. Johnston, original number 134.

Distribution.—Resident in southern British Columbia, east of the coast ranges, northern Washington, east of the Cascades, northern Idaho, northeastern Oregon, and western Montana west of the Continental Divide.

Remarks.—In worn breeding plumage, both *rufescens* and *caliginosus* are noticeably lighter in the color of both the upper parts, and the throat and chest, than in fresh plumage, but regardless of season *caliginosus* can be distinguished by its darker coloration.

Specimens of *Parus rufescens caliginosus* examined.—Total number 23, from the following localities: *Idaho*: Latah County, Moscow, November 11, 1947, female adult; Moscow, 20 miles northeast, June 11, 1947, female adult; June 14, 1947, 2 male adult; June 17, 1947, male immature; Harvard, July 8, 1947, male immature; East Fork Meadow Creek, June 24, 1947, female immature; Deary, May 14, 1948, male adult; December 13, 1951, 2 male adult; February 19, 1953, 2 female adult; Nez Perce County, Lewiston, December 21, 1952, female adult; February 13, 1953, female adult; March 4, 1953, male adult; March 16, 1953, male adult; Clearwater County, Headquarters, February 28, 1952, 2 female adult; March 18, 1956, male adult. *Washington*: Bumping Lake, September 1, 1917, adult female; Blue Mts. (21 miles southeast of Dayton), June 12, 1919, adult male. *Montana*: Columbia Falls, February 18, 1893, adult male; March 6, 1896, adult male.

Troglodytes troglodytes salebrosus new subspecies

Characters.—Similar to *Troglodytes troglodytes pacificus* but decidedly darker, both above and below. Upper parts chocolate brown rather than reddish brown (light russet) as in *pacificus.* Throat, chest, and flanks of under parts dull brown in contrast to light brown of *pacificus.* The barring of the back, characteristic of the other races, especially those in the eastern part of the range of this species, obscure or totally lacking. There is no appreciable size difference.

Measurements.—Adult male – wing 44.5-50(47.3); tail 28-33(30.5); exposed culmen 10-12(11). Adult female – wing 42-48(45); tail 27-30.5 (28.2); exposed culmen 10-12(11).

Type.—Adult male No. 465530, United States National Museum (Fish and Wildlife Service collection): Dismal Lake, Shoshone County, Idaho, June 21, 1951. Thomas D. Burleigh, original number 17217.

Distribution.—Breeds in southern British Columbia, east of the coast ranges, southwestern Alberta, northern Washington east of the Cascades, northern Idaho, northeastern Oregon, and western Montana west of the Continental Divide. Winters at lower altitudes at the southern edge of its breeding range, and casually farther south.

Remarks.—Troglodytes troglodytes salebrosus is the least rufescent of the present recognized races. This character is evident not only in adults, but in juvenal specimens taken during the summer months prior to the post juvenal moult. Immature specimens of *pacificus* taken after the post juvenal moult, are noticeably darker than breeding specimens and in their appearance suggest *salebrosus,* but their rufescent upper parts readily distinguish them from this new race. In this connection it is worth noting that what might be interpreted as color phases in *pacificus* are actually age differences. Birds perceptibly darker than typical breeding individuals proved, where fall specimens were concerned, to have the thin almost transparent skull characteristic of young birds, and consequently were young of the year. This color difference would appear to remain unchanged until the first post nuptial moult, when the characteristic rufescent plumage of *pacificus* is acquired. Females taken at Tillamook, Tillamook County, Oregon, on March 18, 1954, and at Quinault, Grays Harbor County, Washington, on March 22, 1954, are indistinguishable in their dark coloration from specimens in this plumage taken in this coastal region in the fall.

Specimens of *Troglodytes troglodytes salebrosus* examined.—Total number 39, from the following localities: *Idaho*: Latah County, Moscow, October 6, 1948, male adult; October 27, 1950, male adult; October 25, 1951, female adult; March 26, 1952, male adult; September 29, 1952, male adult; October 19, 1953, female adult; April 10, 1954, male adult; April 17, 1954, female adult; October 4, 1954, male adult; May 2, 1955, female adult; October 13, 1955, female adult; September 7, 1956, female immature; March 7, 1957, male adult; November 2, 1957, male adult; Deary, May 7, 1948, male and female adult; November 13, 1948, male adult; December 13, 1951, male and female adult; Harvard, June 30, 1953, male juvenile; Clearwater County, Headquarters, June 14, 1951, male adult; October 27, 1951, male adult; November 11, 1951, male adult; November 7, 1952, female adult; April 21, 1953, female adult; Shoshone County, Avery, June 20, 1951, male adult; Dismal Lake, June 21, 1951, male adult; Bonner County, Hope, June 13, 1903, female juvenile; Priest Lake, October 2, 1897, male adult; Sandpoint, November 26, 1948, female adult; Boundary County, Bonner's Ferry, November 23, 1948, female adult. *Washington*: Grays Harbor County, Aberdeen, January 26, 1957, female adult. *Oregon*: Strawberry Mts., Grant County, July 14, 1915, male adult. *Montana*: Java, June 19, 1895, male adult; Gird Creek Canyon, Ravalli County, October 24, 1945, female adult. *Nevada*: Cottonwood Range, September 19, 1896, female adult; Truckee Reservation, December 25, 1867. *Wyoming*: Teton Pass, September 15, 1910, female immature; Moose Creek, Teton Mts., August 27, 1910, male immature. *British Columbia*, Moose Pass, July 29, 1911, male adult.

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PROCEEDINGS
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DESCRIPTION OF A RACE OF THE SHEARWATER *PUFFINUS LHERMINIERI* FROM PANAMA

By Alexander Wetmore

Shearwaters of this species have been noted as seen occasionally in the southern part of the Caribbean Sea, but there has been little reported concerning them. The only specimen on record for the area is one obtained by Enrico Festa in May 1895, when on board ship 300 miles from Colón. The typical race, *Puffinus lherminieri lherminieri* breeds on Bermuda, in the Bahama Islands, on Mona Island west of Puerto Rico, on Little Saba Island (near St. Thomas), Ginger Island (near Tortola), on numerous islets in the Lesser Antilles between St. Martin and Barbados, and on islets off Tobago. The race described herewith is from a hitherto unrecorded population that nests on an island off the coast of northwestern Panamá on the southern shore of the Caribbean, 1200 miles or more distant from any of its relatives.

Puffinus lherminieri loyemilleri subsp. nov.

Characters.—Similar to Puffinus lherminieri lherminieri Lesson[1] but smaller.

Description.—Type, U. S. Nat. Mus. No. 468691, Male, Tiger Rock, Tiger Cays, off Cabo Valiente, Valiente Peninsula, Bocas del Toro, Panamá, collected February 25, 1958, by A. Wetmore (original number 22182). Upper surface from crown to tail, except as indicated, between dark Quaker drab and sooty black; hind neck and wings dark Quaker drab; entire under surface white, except as indicated; posterior half of loral area mixed white and dark Quaker drab; anterior half of lores, anterior two-thirds of upper eyelid, and lower eyelid white; posterior margin of eyelids deep Quaker drab; sides of neck deep mouse gray; flanks between deep and dark mouse gray; under tail coverts deep mouse gray, tipped lightly with white and white basally; edge of wing between dark Quaker drab and sooty black; under wing coverts white; axillars white, tipped lightly with dark mouse gray. Culmen black; sides of bill mouse gray; lower surface of mandible grayish olive; tarsus, middle and inner toes drab; line down ridge of back of tarsus, and outer toe sooty black. (From dried skin.)

Measurements.—Males (6 specimens), wing 185-193 (188), tail 80.7-

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[1] *Pufflnus* (sic) *Lherminieri* Lesson, Rev. Zool., vol. 2, no. 3, Apr. (May) 1839, p. 102. (Straits of Florida).

87.7 (85.2), culmen from base 27.1-30.1 (29.3), tarsus 38.4-39.8 (39.3) mm.

Females (5 specimens), wing 185-195 (190), tail 82.8-88.5 (86.3), culmen from base 27.7-31.2 (29.2), tarsus 38.2-40.0 (39.0) mm.

Type, male, wing 186, tail 85.4, culmen from base 29.5, tarsus 39.8 mm.

Range.—Known only from the Tiger Cays, off the Valiente Peninsula, Bocas del Toro, Panamá.

Remarks.—The colony of shearwaters in the Tiger Cays was found by Dr. Loye Holmes Miller in 1936 during a brief visit to the Chiriquí Lagoon area, where he was located on a survey ship of the Hydrographic Office of the Navy. A seaman returning from placing a beacon on a rocky island told of seeing birds with single large eggs in holes in the ground. Dr. Miller visited the site on March 12, and found four occupied nesting holes of the Audubon's shearwater, with eggs that ranged from fresh to nearly ready to hatch. He prepared two skins, and a skeleton, and secured other bones from carcasses eaten by vultures. The specimens, placed in the collections at the University of California in Los Angeles, attracted no special attention since the normal breeding range of Audubon's Shearwater was not well known at that time, and it was not realized that this was an unusual extension in range. The skins came to attention recently through a list of birds from Panamá in the University collections sent to me through the interest of Dr. Thomas R. Howell. In recent correspondence Dr. Miller kindly furnished me with a description and a rough map of the locality, from which Mr. Thomas R. Dunn of the Chiriqui Land Company at Almirante, through his knowledge of the area gained in fishing excursions, identified the islet as what is known locally as "Tiger Rock" in the Tiger Cays off the end of the Valiente Peninsula. With this information, on February 25, 1958, during a day of favorable weather, I crossed from Almirante in a dugout canoe with an outboard motor, located the island, and found the shearwater colony. The Tiger Cays lie in line from 3000 meters north to 5000 meters northwest of Cabo Valiente at the end of the peninsula. The outermost, at the northwest, is a submerged rock that is awash. Next is a higher rock bearing a navigation beacon, which is designated as "Tiger Rock" in the chart and sailing directions for this region. Then comes a slightly larger islet, followed by a larger, longer one, of several separated sections which is known locally as Tiger Rock. At the western end this island is nearly divided by a cleft through which storm waves wash. The higher ground at either side of this depression has a stand of coconuts and guarumos (Cecropia), with undergrowth of coarse grass, caña blanca, and other plants. I stepped ashore at the cleft on a partly submerged rock, and, after a brief examination, climbed the bare rock to the top of the eastern sector. Immediately I noted feathers, fresh droppings, and the pungent odor of shearwaters, and on the steep landward slope, where there was protection from the northern and eastern winds found the openings of numerous burrows. In the hour and a half that I was able to remain I examined only a limited area in which I secured 9 birds and 5 eggs. It had not been possible to beach the cayuco because of the heavy swells, so that when the wind began to freshen I had to leave in order to gain the distant shelter of Crawl Cay channel before the sea became too rough for our small craft. Another island in this group of cays, that is larger, lies to the eastward of the one I visited.

It should be noted that there is also a small island along the eastern shore of Isla Popa on the northern side of the Laguna de Chiriquí that locally is called Tiger Cay, that has no connection with the Tiger Cays described above.

The smaller size that appeared evident in examining the two specimens collected in 1936 is verified in the nine specimens that I obtained. The following measurements taken from specimens of *P. l. lherminieri* in the U. S. National Museum, American Museum of Natural History, Museum of Comparative Zoology, and the British Museum (Natural History), will indicate the difference.

Males (31 specimens), wing 195-209 (201), tail 83.5-95.0 (88.2), culmen from base 28.1-31.8 (30.0), tarsus 37.8-42.5 (40.2) mm.

Females (29 specimens), wing 193-210 (200), tail 83.7-95.0 (88.9), culmen from base 25.7-31.0 (29.2), tarsus 38.0-41.8 (40.4) mm.

The birds from Bocas del Toro have the side of the head including the eyelid white, with only a very slight amount of gray in some individuals. While these markings vary in typical *P. l. lherminieri*, the gray in most is of greater amount. The difference is slight and may not hold in larger series.

The eggs, pure white in color, with the shell slightly pitted, vary in form from subelliptical to long subelliptical and long oval. The measurements, in millimeters, are as follows: 48.3 × 35.3, 51.3 × 36.3, 52.2 × 34.7, 53.1 × 34.5, 53.9 × 35.3.

While these sizes come within the lower limits of measurement for eggs of *Puffinus l. lherminieri*, the maximum found in this small series of *loyemilleri* is appreciably less, this being 57.3 mm. for length, and 40.8 mm. in breadth in the nominate form. The average for *loyemilleri* thus appears to be smaller.

The new form appears intermediate between the nominate race and the much smaller *P. l. boydi* Mathews of the Cape Verde Islands. It is named for Dr. Loye Miller in recognition of his many contributions to the science of ornithology.

Vol. 72, pp. 23-32 April 22, 1959

PROCEEDINGS
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AN ELUCIDATION OF THE NEOTROPICAL GENUS CHINAIA WITH A KEY TO MALES AND A NEW ALLIED GENUS

[Homoptera: Cicadellidae: Neocoelidiinae]

By JAMES P. KRAMER
Entomology Research Division Agr. Res. Serv. U.S.D.A.

In an earlier paper (1958 Proc. Biol. Soc. Wash. 71:69-74), I described six new species of the genus *Chinaia* from Central America and included a check-list of the species assigned to or described in this genus. All of the species enumerated in the check-list have now been studied. Many of the species are known from uniques which necessitated the study of types. This study was made possible through the very kind cooperation of the following entomologists: W. E. China of the British Museum, G. E. Wallace of the Carnegie Museum in Pittsburgh, and R. Linnavuori of Turku, Tyttölyseo, Finland. Of the thirteen species included in my original check-list, eleven are now considered to be members of *Chinaia*. One of the eleven is known only from a partly mutilated female and its inclusion is, perhaps, questionable. One of the two species now excluded from *Chinaia* has been referred to *Coelidiana*, while the other appears to be a deltocephaline with uncertain generic affinities. In the course of this study, two new species representing a new genus closely allied to *Chinaia* were discovered. This paper, then, treats *Chinaia*, the species removed from *Chinaia*, and the new closely related genus with its two new species. A revised check-list of *Chinaia* is also included.

Chinaia Bruner and Metcalf

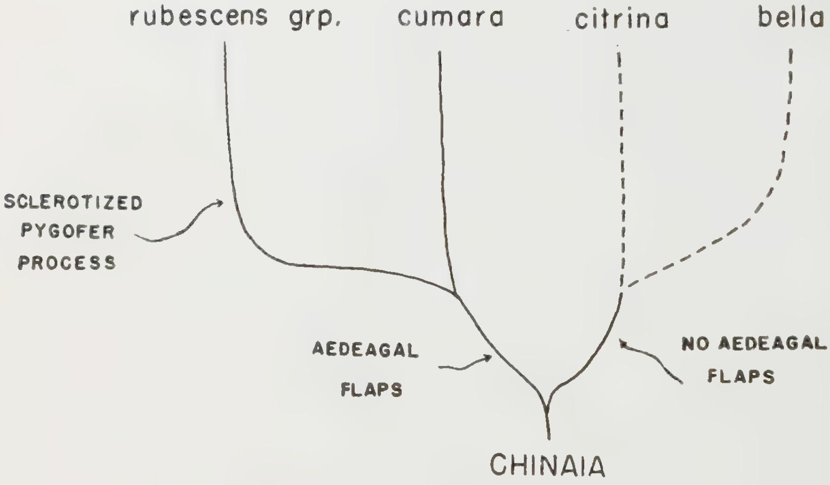
1934. Bull. Brooklyn Ent. Soc. 29(3):120.
Type of genus *Chinaia bella* Bruner and Metcalf.

Head narrower than pronotum and broadly rounded anteriorly, length of crown much less than basal width between the eyes. Anterior margin of head without a carina. Ocelli on face at a considerable distance below anterior margin of head. Clypellus much wider distally than basally. Antennae as long or longer than the body. Pronotum much wider than long. Scutellum very large and triangular, as long as pronotum. Venation obscure except at apex of the long tegmina.

Coloration yellowish to pale orange with extensive orange to bright red orange markings. Dark brown markings often found on clavus and apical portion of tegmina.

Male genitalia. Valve quite obscure in uncleared specimens. Plates deep and scoop-shaped. Pygofer either with dorsal processes or an elongation of terminus. Connective cruciform, not fused with aedeagus Aedeagus moderately straight or recurved with gonopore opening apically or dorso-apically, except in *bella* where the opening is at the distal portion of the shaft. Aedeagus with or without lateral flaps.

The genus *Chinaia* as presently interpreted includes species which exhibit rather diverse genitalic patterns. Even though some splitting of the genus could be justified on the basis of these divergences, it is believed that little would be accomplished by so doing at this time. Females which are presently unrecognizable to species would then be unrecognizable to genus.



Proposed phylogeny of the genus *Chinaia*

The known species of *Chinaia* fall into two groups based upon the presence or absence of the aedeagal flaps. Those species with the aedeagal flaps form two lines. One of these lines is represented by a single species *cumara* in which paired processes have developed between the aedeagus and flap; while the other line, containing most of the species in the genus, has evolved a distinct sclerotized dorsal pygofer process.

The group which lacks the aedeagal flaps is represented by two species: *bella* and *citrina*. Here the pygofer has elongated and exceeds the male plates. On the basis of the aedeagus, these two species are not very close and probably represent distinct branches. In *bella* the gonopore is located at the distal portion of the broadly recurved tip. In *citrina* the gonopore is at the apex of the slender U-shaped shaft.

The key which follows will allow separation of the males. The females on hand are not associated with males, except in one case, and are not treated at this time.

Chinaia: Key to Males

1. Pygofer in lateral view with a distinctly sclerotized dorsal process 2
   Pygofer in lateral view with terminus prolonged or modified without sclerotized process 8
2. Pygofer process approximately "S" shaped (fig. E2)* 3
   Pygofer process variously formed but not "S" shaped 4
3. Proximal portion of clavus concolorous .... *caprella* Kramer
   Proximal portion of clavus with an orange stripe .. *permista* Kramer
4. Pygofer process elongate caudad and decurved 5
   Pygofer process neither elongate caudad nor decurved 7
5. Pygofer process bifurcate at apex (fig. D2)* .... *bifurcata* Kramer
   Pygofer process entire at apex 6
6. Pygofer processes in dorsal view straight, terminating wth incurved hooks (Plate I, fig. 13) .... *agarista* Kramer
   Pygofer processes in dorsal view curved outward and without hooks (Plate I, fig. 12) .... *rubescens* (Fowler)
7. Aedeagus in lateral view narrowed on distal one-half (fig. C3)* .... *lepida* Kramer
   Aedeagus in lateral view narrowed on distal three-fourths (Plate I, fig. 7) .... *ornata* (Osborn)
8. Aedeagus with paired basal accessory processes (fig. A3)* .... *cumara* Kramer
   Aedeagus without processes 9
9. Pygofer terminus undulate and hooked (Plate I, fig. 1) .... *bella* Bruner & Metcalf
   Pygofer terminus expanded and then narrowed at apex (Plate I, fig. 8) .... *citrina* Evans

*These fig. numbers refer to illustrations which appeared with the original description in 1958 Proc. Biol. Soc. Wash. 71: 69-74. All of the authors species are treated in this earlier paper.

Chinaia rubescens (Fowler)

1900 *Tettigonia rubescens* Fowler, Biologia Centrali-Americana 2: 282-283, with illustration in color Tab. 19, fig. 7.

Fowler's original description is quoted here: "Pale testaceous, with the base and sides of the pronotum, a broad band on the tegmina, and sometimes the apical portion of the scutellum, red, the red band on the tegmina occasionally covering the whole of the corium except the apex; head short, but longer than the pronotum, which is very short, scarcely produced before the eyes and broadly subtruncate, eyes prominent; tegmina much narrowed toward the apex; legs light testaceous-yellow. Long. 7-8 millim.; lat. 2-2½ millim. Hab. Panama, Volcan de Chiriqui 2500 to 4000 feet (Champion."

Male genital structures. (Pl. I, figs. 11-12) Pygofer process long and spearlike, almost identical to *agarista* in lateral view. In dorsal view the pygofer process is curved laterally without terminal hooks. The ædeagus is like that of *agarista*.

Specimens studied. Two males and one female with data; San Isidre del General, Costa Rica, D. L. Bounds. No dates when collected.

The identity of this species is based upon a male paratype located in the British Museum bearing same collection data as the type specimen

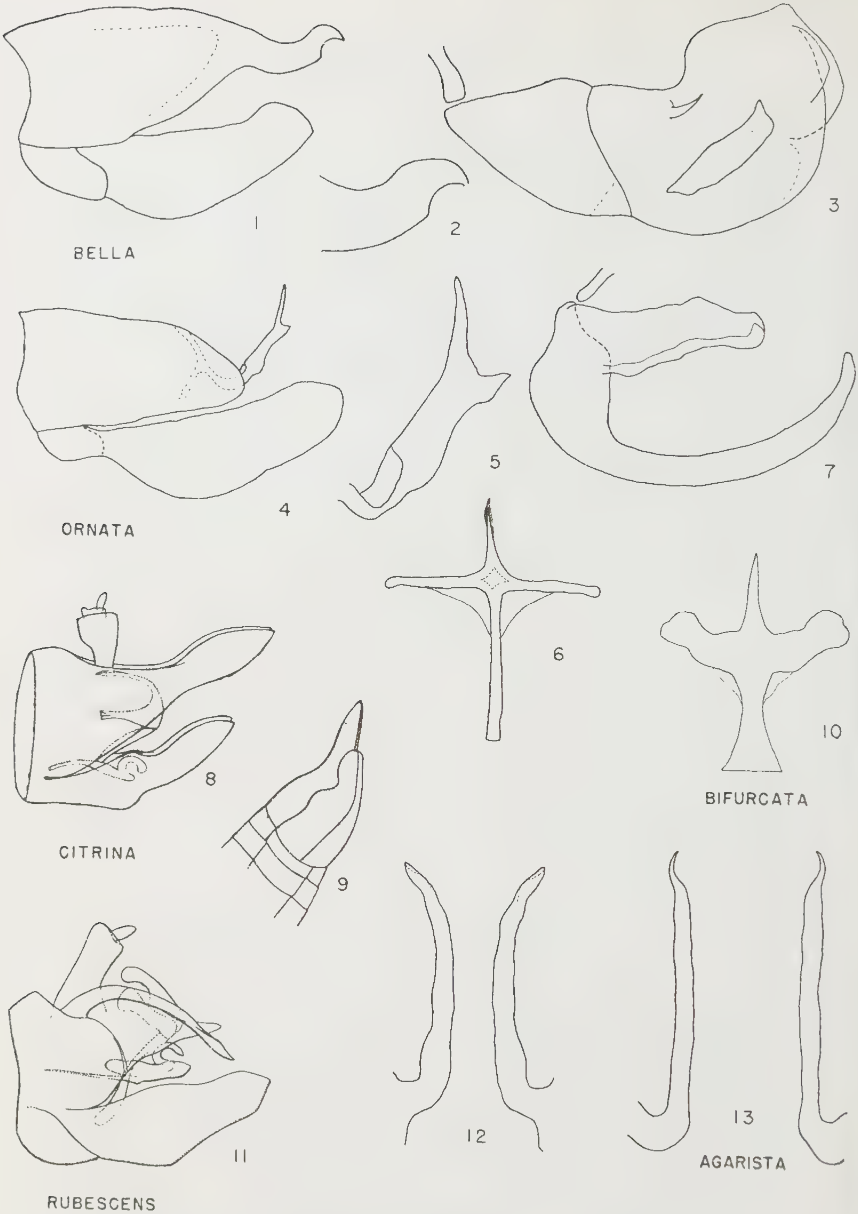


Plate I *Chinaia*

C. bella [1-3] 1. lateral view of pygofer, valve, and male plate. 2. enlarged pygofer extension. 3. lateral view of aedeagus. *C. ornata* [4-7] 4. lateral view of pygofer, valve, and male plate. 5. enlarged pygofer process. 6. ventral view of connective. 7. lateral view of aedeagus. *C. citrina* [8-9] 8. lateral view of whole genital capsule. 9. three-quarters view of genital capsule. *C. bifurcata* [10] 10. ventral view of connective. *C. rubescens* [11-12] 11. lateral view of whole genital capsule. 12. dorsal view of pygofer processes. *C. agarista* [13] 13. dorsal view of pygofer processes.

which is a female. Dr. W. E. China sketched the genitalia and his drawing is used here. *C. rubescens* and *C. agarista* are very close species and can be distinguished with certainty only by the shape of the pygofer process in dorsal view as indicated in the key. Unfortunately the male paratype of *C. rubescens* has been mounted on a slide in lateral view which does not allow a dorsal observation to be made. However, the specimens which I have studied agree in certain other details with the *C. rubescens* paratype. These details are the curvature of the pygofer process in lateral view and the absence of dark brown markings on the clavus and apical cells. The drawings of the pygofer processes were made from Costa Rican specimens.

Chinaia ornata (Osborn)

1924 *Neocoelidia ornata* Osborn, Ann. Carnegie Museum 15 (4):449.

The original description is quoted as follows: ''Head short, scarcely produced, narrower than pronotum; vertex wider than long, as long at middle as next the eye; ocelli considerably below the middle of the eye, three times their diameter from the eye; antennae extremely long, longer than entire insect, the outer part of the setae very delicate and irregularly bent and twisted; front somewhat inflated, narrowed abruptly at tip; clypeus short, scarcely longer than wide, widening toward tip, apex truncate; lorae broad, approaching border of cheek; cheeks broad. Pronotum short, one-half longer than vertex, lateral borders curved, hind border faintly sinuate; elytra long, narrowing to apex, appendix narrow. Genitalia: male, plates short, tumid; tips compressed, and bluntly rounded.

Light yellow, with the hinder border of pronotum and cheek, lateral and apical portion of scutellum, a broad discal and apical spot on clavus, an elongate basal spot on corium, a transverse discal spot from sub-costa to claval suture touching apical spot on clavus, two somewhat oblique spots on anteapical cells, orange-red; a darker orange band bordered with fuscous on anteapicals; four blackish dots on apical veins; apical areoles smoky; wings milky subhyaline. Beneath, pale creamy; tarsal claws dusky.

Length: 6.75 mm.

This very ornate species is represented by a single specimen from Valparaiso (2500 ft.) Dept. of Magdalena, Colombia, July, 1898, C. M. Acc. No. 1999 (H. H. Smith coll.)''

Male genital structures. (Pl. I, figs. 4-7) Pygofer process erect, rather slender with a large tooth on posterior margin and narrowed apically. Aedeagus in lateral view recurved with shaft narrowed. The drawings were made from the type specimen which was generously loaned through the courtesy of Dr. G. E. Wallace and the Carnegie Museum of Pittsburg.

Chinaia bella Bruner and Metcalf

1934 *Chinaia bella* Bruner and Metcalf, Bull. Brooklyn Ent. Soc. 29(3): 121-122.

This species was thoroughly treated in the original description both verbally and pictorially. Sufficient to say that *bella* has the same general habitus as the other members of this genus and can only be identified satisfactorily on the basis of the male genitalia.

Male genital structures. (Pl. I, figs. 1-3) As indicated in the key, the

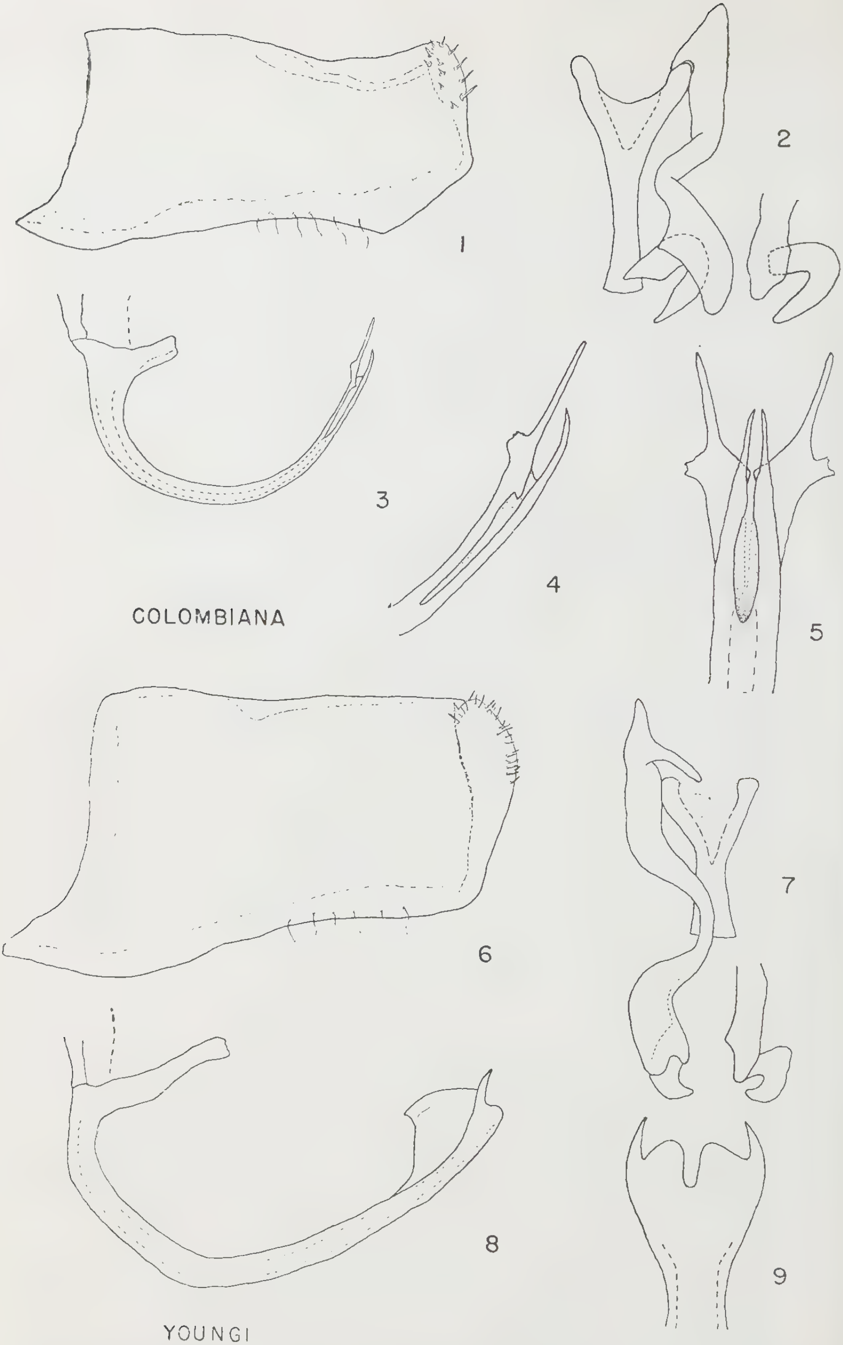


Plate II *Xenocoelidia*

X. colombiana [1-5] 1. lateral view of pygofer. 2. ventral aspect of connective and style (only one drawn) also apex of style in lateral view. 3. lateral view of aedeagus. 4. enlarged lateral view of aedeagus apically. 5. direct caudal aspect of aedeagus apically. *X. youngi* [6-9] 6. lateral view of pygofer. 7. ventral aspect of connective and style (only one drawn) also apex of style in lateral view. 8. lateral view of aedeagus. 9. direct caudal aspect of aedeagus apically.

pygofer is prolonged distally, undulate with an apical hook. The aedeagus is massive and broadly recurved apically. Unlike the other members of the genus the gonopore opens at the distal portion of the shaft. The drawings used here were prepared from a specimen taken from the type series.

Chinaia citrina Evans

1947 *Chinaia citrina* Evans, Trans. Royal Ent. Soc. London 98(6):254.

Evan's description is quoted here: "Length 8 mm. Head yellow, antennae orange, eyes dark brown. Thorax: pronotum medially yellow, the remainder orange. Scutellum orange. Tegmen yellow with transverse and longitudinal orange markings and with two large oval, and a few small brown markings adjacent to apex. Thorax, ventral surface yellow. Abdomen, ventral surface orange.

Type male from Essequibo River, British Guiana (Oxford University Expedition ix. 29)."

Male genital structures. (Pl. I, figs. 8-9) The terminus of the pygofer is elongate. This elongation is widest near the middle, narrowed at the base and apex which is pointed. The shaft of the aedeagus is greatly narrowed and recurved.

Dr. W. E. China very kindly dissected the type specimen and prepared the drawings which are used in this paper.

Chinaia smithii (Baker)

1898 *Neocoelidia smithii* Baker, Canadian Ent. 30:291-292.

C. smithii is known from a single female. The type has the tegmina missing. Even though this species has the general habitus of a *Chinaia,* the exact generic placement remains in doubt until males are available for study. The original description is included here:

"Female. Length 8 mm. Pale yellowish with faint touches of reddish on sides of front, pronotum, scutel, and along commissural margin of clavus. Elytra shining yellowish, subhyaline, with four dark spots on inner margin, three on clavus and one beyond; with a complete transverse decoloured band before transverse nervures, which is edged before near costa with a dash of red; with another partial decoloured band beyond transverse nervures which is edged near costa with fuliginous. Costal margin of elytra and first sector of wings greenish. Wing subhyaline, with a median row of three fuliginous spots; veins pale brown, excepting first sector. Last ventral segment but little longer than preceding, hind margin truncate, with the lateral angles somewhat produced.

Described from a single specimen from Brazil."

Revised check-list of species of *Chinaia*

1. *agarista* Kramer, 1958. Proc. Biol. Soc. Wash. 71:74—Panama.
2. *bella* Bruner and Metcalf, 1934. Bull. Brooklyn Ent. Soc. 29(3): 121—Costa Rica.
3. *bifurcata* Kramer, 1958. Proc. Biol. Soc. Wash. 71:71—Panama.
4. *caprella* Kramer, 1958. Biol. Soc. Wash. 71:71—Panama and Canal Zone.
5. *citrina* Evans, 1947. Trans. Royal Ent. Soc. London 98(6):254—British Guiana.
6. *cumara* Kramer, 1958. Proc. Biol. Soc. Wash. 71:73—Guatemala.

7. *lepida* Kramer, 1958. Proc. Biol. Soc. Wash. 71:73-74—Canal Zone.
8. *ornata* (Osborn), 1924. Ann. Carnegie Museum 15(4):449—Colombia.
9. *permista* Kramer, 1958. Proc. Biol. Soc. Wash. 71:71-72—Canal Zone.
10. *rubescens* (Fowler), 1900. Biologia Centrali-Americana 2:282-283—Panama and Costa Rica.
11. *smithii* (Baker), 1898. Canadian Ent. 30:291-292—Brazil.

Species removed from *Chinaia*

Coelidiana undata (Linnavuori) new combination

1956 *Chinaia undata* Linnavuori, Ann. Ent. Fenn. 22(1):35.

The original description is as follows: ''Length 7 mm. Face and under surface pale yellow, vertex, pronotum and scutellum orange-yellow, base of the latter bordered with black and apex with two large black spots. Elytrae yellow, clavus with a black undate stripe (as in *Platymetopius undatus* DeG.), other parts of the clavus reddish, basal margin black. The 1st and 2nd apical cells smoky brown, bases of 3rd and 4th apical cells with a broad black-brown transverse band, and furthermore two large round black spots at the upper cross-veins. Abdomen orange-yellow, legs yellow. Brazil: Nova Teutonia 16 VIII 1938.''

Through the courtesy of Dr. R. Linnavuori, a paratype male was made available for study. It is clearly not a *Chinaia* but belongs to *Coelidiana*. DeLong's paper (1953 Lloydia 16(2):93-131), in which many of the Neocoelidiinae are treated, keys out this genus. On the basis of genitalia, *C. undata* greatly resembles *C. bidentata* (illustrated in DeLong's paper pl. 8 fig. 4). However, in *C. undata* the pygofer is shorter and has but one ventral tooth, while *C. bidentata* has two teeth. Further, in *C. undata* the carina separating the crown and face is very distinct; and while distinctly produced, the anterior margin of the head is broadly rounded in dorsal view. The head of *C. bidentata* has a less distinct carina and is rather bluntly pointed. The color patterns of the two species are very different as indicated in the descriptions.

Neocoelidia punctata Osborn

1923 *Neocoelidia punctata* Osborn, Ann. Carnegie Museum 15(1):77-78.

Study of the type of this species reveals that this is not a *Chinaia* but actually belong to the leafhopper subfamily Deltocephalinae with generic placement uncertain. Osborn's *punctata* lacks the ledge above the antennal pit which is characteristic of all Neocoelidiinae and has styles typical of many deltocephalines.

Xenocoelidia new genus

Type of genus *Xenocoelidia youngi* new species.

Resembles *Chinaia* but differs in shape of clypellus, position of ocelli, modification of male pygofer, and shape of both the connective and styles.

Head either nearly as wide as pronotum or distinctly narrower and broadly rounded anteriorly, length of crown much less than basal width between eyes. Anterior margin of head without a carina. Ocelli on margin of vertex and visible in dorsal aspect. Clypellus very slightly expended before apex. Both clypellus and clypeus rather tumid. Antennae as long as body. Pronotum much wider than long. Scutellum very large and triangular, as long as pronotum. Tegmina long with venation obscure except at apex.

Coloration whitish to yellowish with or without brown, yellow, or red markings.

Male genitalia. Valve obscure in uncleared specimens. Plates deep and scoop-shaped. Pygofer lacking processes or lobes. Terminus of pygofer slightly thickened, bearing setae. Connective Y-shaped and closely associated with the aedeagus but not solidly fused. Style long and slender with a mesal curvature. Aedeagus slender and broadly U-shaped. Gonopore apical or subapical.

Xenocoelidia youngi new species

Length male 8 mm.

Head narrower than pronotum. Lorum as large as clypellus. Ground color a uniform ivory white. Apex of tegmina bright yellow hyaline.

Tiny fuscous spot at tip of each clavus and a very slight darkening at center of commissural margin.

Male genitalia. (Plate II, figs. 6-9) Aedeagus slender and curved dorsally, apex in lateral view with a sharp tooth and an acute blade-like dorsal expansion. Gonopore opens apically.

HOLOTYPE male, Buenaventura, Colombia, 1941, C. L. Fagan. U.S.N.M. type no. 64572. Female unknown. This species is named for one of the world's foremost students of the Cicadellidae, Dr. David A. Young, Jr.

Xenocoelidia colombiana new species

Length male 7 mm.

Head slightly narrower than pronotum. Lorum smaller than clypellus. Ground color whitish. Scape and basal half of pedicel bright pink. Anterior margin of head with a pale yellow band below and a bright orange band above. Pronotum with lateral margins and an irregular broadly U-shaped marking centrally located near anterior margin, bright orange. Claval suture with a pale yellow band becoming obscure distally. Clavus with a moderately broad somewhat dusky orange stripe running along scutellum and commissural margin. A brown spot flanks stripe laterally before apex of each clavus. Apex of tegmina brown hyaline.

Male genitalia. (Plate II, figs. 1-5) Aedeagus slender and curved dorsally, split apically in lateral view. Gonopore subapical on venter of shaft.

HOLOTYPE male, Puente Licio, Guasca-Gachetá, Cundinamarca, Colombia, Feb. 20, 1942, Edward A. Chapin, sweeping herbage. U.S.N.M. type no. 64573. Female unknown. Dr. Chapin supplied this additional information: Puente Licio is a bridge across a small stream that crosses the main highway running between Guasca and Gachetá, on the east slope of the Cordillera Oriental.

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PROCEEDINGS

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A NEW SUBSPECIES OF VEERY FROM THE NORTHWESTERN UNITED STATES

By Thomas B. Burleigh and Allen J. Duvall
U. S. Fish and Wildlife Service, Washington, D. C.

In a collection of birds taken by Ira N. Gabrielson in Rio Blanco County, Colorado, in 1948 there was a Veery (a female collected on September 20) that could not be allocated to any of the three recognized races. It most closely recembled *Hylocichla fuscescens salicicola* but its grayish upper parts separated it readily from this western form. It was of decided interest, therefore, when subsequently a critical examination of a series of breeding Veerys taken in northern Idaho revealed the fact that they possessed all the characters by which this migrant Colorado specimen was distinguished from the other races of *Hylocichla fuscescens.* These individuals of the extreme western breeding population of the Veery represent a distinct and undescribed race that may be known as:

Hylocichla fuscescens subpallida new subspecies

Characters: Differs from all other races of *Hylocichla fuscescens* in having the upper parts duller, with a gray wash entirely lacking in any other races of Veery examined; crown darker than in *salicicola,* approaching *fuliginosa* in this respect; buff of throat averaging paler, and less heavily marked with dusky. Birds taken in August, after the completion of the post nuptial moult, equally distinct. No appreciable size difference.

Measurements: Nine breeding males from northern Idaho and eastern Washington: Wing, av. 101 mm. (extremes 98-103.5); tail 77.5 (76-80); exposed culmen 13 (12.5-14). Five breeding females from northern Idaho and eastern Washington: Wing, av. 98.5 mm. (97-101.5); tail 73.5 (72.5-75); exposed culmen 12.3 (12-13.5).

Type: Adult male No. 419601, United States National Museum (Fish and Wildlife Service collection): Moscow, Latah County, Idaho, June 10, 1951, Thomas D. Burleigh, original number 13895.

Distribution: Breeds in northern Washington, east of the

Cascades, northern and central Idaho, and western Montana west of the Continental Divide. Winter range not known.

Remarks: Robert Ridgway, in his original description of *H. f. salicicola,* did not designate a type specimen. At a later date he indicated Nos. 66667 and 79460 (U. S. National Museum) as types, evidently making a male and a female type for the race. With one exception (79461—Fort Garland, Colorado) all of the specimens upon which Ridgway based his description of *salicicola* are in the U. S. National Museum. The type series is composed of May, June, and September specimens from Colorado, eastern Montana, Wyoming, and North Dakota. All resemble the additional breeding birds examined from these areas. Since no type was designated in the original description we hereby select No. 66667 from Fort Garland, Colorado, May 26, 1872, as the type, and restrict the type locality of *salicicola* to Fort Garland, Colorado. This specimen is one of the small series which Ridgway had selected subsequent to his description.

Specimens of Hylocichla fuscescens subpallida examined: Total number, 57, from the following localities: *Idaho:* Bonner's Ferry, Boundary County, June 22, 1957, ♂ adult; St. Maries, Benewah County, June 22, 1948, ♂ adult; Potlatch, Latah County, May 21, 1948, ♂ adult; August 13, 1948, ♂ immature; August 16, 1948, ♀ immature; May 26, 1949, ♀ adult; July 13, 1949, ♀ adult; May 24, 1950, ♂ adult; July 12, 1951, ♂ and ♀ adult; August 2, 1951, ♂ juvenile; August 26, 1951, ♀ immature; May 13, 1952, ♂ adult; July 20, 1952, ♂ adult; August 3, 1952, ♂ juvenile; August 12, 1956, ♀ adult; June 30, 1957, ♀ adult; Princeton, Latah County, May 30, 1949, ♂ adult; Moscow, Latah County, May 25, 1948, 2 ♂ adult; July 19, 1949, ♀ adult; August 18, 1949, ♂ immature; August 23, 1949, ♀ immature; September 2, 1950, ♂ adult; May 16, 1951, ♂ adult; June 10, 1951, ♂ adult; May 21, 1952, ♂ adult; May 22, 1953, ♂ adult; September 7, 1957, ♀ immature; June 16, 1958, 2 ♀ adult; Orofino, Clearwater County, June 12, 1951, ♂ adult; July 1, 1952, ♂ adult; Lapwai, Nez Perce County, July 12, 1950, ♂ adult; Cambridge, Washington County, June 4, 1951, ♂ adult; June 7, 1952, ♂ adult; Challis, Custer County, June 29, 1950, ♀ adult; Sun Valley, Blaine County, June 28, 1950, ♂ adult; Henry's Lake, Fremont County, June 11, 1957, ♂ adult. *Washington:* Entiat, Chelan County, July 5, 1910, ♀ adult; July 12, 1918, ♀ adult; July 13, 1918, ♂ adult; Winthrop, Okanogan County, June 23, 1943, ♂ and ♀ adult; Spokane, Spokane County, June 18, 1948, ♂ adult; June 24, 1948, ♂ adult; July 15, 1957, ♀ adult; August 19, 1957, ♀ immature; Pullman, Whitman

County, May 29, 1948, ♀ adult; August 15, 1948, ♂ immature; August 20, 1949, ♂ immature; September 6, 1949, ♂ immature; June 11, 1953, ♂ adult; Palouse, Whitman County, July 16, 1950, ♂ adult; Uniontown, Whitman County, July 8, 1951, ♂ adult; Yakima, Yakima County, July 6, 1952, ♂ adult. *Montana:* Drummond, Granite County, June 29, 1956, ♂ adult.

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PROCEEDINGS
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A NEW SPOTTED GROUND SQUIRREL FROM MEXICO

By Donald F. Hoffmeister

Museum of Natural History, University of Illinois, Urbana

Collecting of mammals by students at the University of Illinois in the sand dunes of northern Chihuahua has revealed the presence there of an undescribed race of the spotted ground squirrel, *Citellus spilosoma.* The particular sand dunes are those surrounding the small town of Samalayuca, twenty-four miles south of El Paso, Texas.

Spotted ground squirrels are not abundant in this dune area in summer, when collecting has been done. For example, on the fourth of August, 1958, the first squirrel was not seen moving about on the dunes until late afternoon (after 4:30 p.m.). On the same day, the sun-temperature on these dues was 116°F. at 12:30 p.m.; 120°F. at 2:00 p.m. On another occasion, temperature taken in the early morning ranged from 90°F. to 98°F. between 8.00 a.m. and 9:30 a.m.

The dunes consist of light-colored but not white sands. There are only a few shrubby plants, such as mesquite and yucca, growing in the dunes.

Two other rodents are endemic to the sand dunes area near Samalayuca: *Dipodomys ordii extractus* Setzer and *Onychomys leucogaster albescens* Merriam.

Capitalized color terms are from Ridgway, Color Standards and Color Nomenclature (1912). Measurements are in millimeters.

Citellus spilosoma ammophilus, new subspecies

Type.—Adult, female, skin and skull, No. 12472, Univ. Illinois Mus. Nat. Hist., from 5½ mi. N Samalayuca, Chihuahua, Mexico; collected August 2, 1956, by Wayne H. Davis, original No. 2469.

Range.—Known only from the sand dunes area in the vicinity of Samalayuca, Chihuahua.

Diagnosis.—A race of *Citellus spilosoma* characterized by especially pale coloration. On the dorsum, in an area of minimum spotting, general color effect near Cream-Buff *c.* Color on dorsum of tail near Cinnamon-Buff *c* with terminal tip whitish. Underside of tail near Pinkish Buff. Dorsal surface of front and hind feet white. Eye ring present but so similar in color to adjacent light-colored areas that it gives the impression of being reduced or nearly absent. Lateral line area white. Underparts white.

In external measurements, *ammophilus* is of an average size for the species; skull slightly smaller than average. See *Measurements.*

Comparisons.—*Citellus spilosoma ammophilus* differs from *Citellus* *spilosoma canescens* and *Citellus spilosoma arens* as follows: Upper parts much lighter; eye ring less conspicuous; dorsal surface of front feet whitish rather than Cinnamon-Buff or Pinkish Buff; dorsal surface of hind feet lighter; upper and under side of tail paler; sides along lateral line whitish rather than washed with Pinkish Buff or Pinkish Cinnamon; nearly all measurements, external and cranial, larger than for specimens of *canescens* from southeastern Arizona; hind foot especially larger; tail shorter.

Citellus spilosoma ammophilus differs from *Citellus spilosoma pallescens* in coloration much as it differs from *C. s. canescens.* It is paler or lighter in all respects. In external measurements, smaller than most *pallescens;* tail noticeably shorter but hind feet of large size in both subspecies. Skull of about same size as most specimens of *pallescens,* but more constricted in postorbital region.

Citellus spilosoma ammophilus differs from *Citellus spilosoma major* in much paler coloration; shorter tail; slightly smaller skull.

Measurements.—The type, an adult female, and a subadult female from 4.8 mi. S Samalayuca are, respectively: total length, 232, 232; length of tail, 68, 74; length of hind foot, 36, 35; length of ear, 8, 10; greatest length of skull, 39.8, 38.0; palatilar length, 17.6, 16.8; zygomatic breadth, 24.0, 23.1; cranial breadth, 19.2, 18.3; interorbital breadth, 9.1, 8.1; postorbital constriction, 14.2, 13.1; length of nasals, 13.7, 11.9; alveolar length of maxillary toothrow, 8.4, 7.9.

Remarks.—*Citellus spilosoma ammophilus* is the palest-colored race of the species. *C. s. ammophilus* occurs in a geographic area between the ranges of the races *canescens, pallescens,* and *major.* It differs from all three in lighter color; in addition, from *canescens* in larger size; from *pallescens* in smaller size and shorter tail; from *major* in slightly smaller size of skull and shorter tail.

Vernon Bailey (Proc. Biol. Soc. Wash., **15**: 118, 1902) described the subspecies *C. s. arens* from El Paso, Texas, which is not far-distant from the type locality of *C. s. ammophilus.* It seems clear after examining Bailey's material that the name *arens* does not apply to specimens from the dunes near Samalayuca. His race is very similar to *C. s. canescens.*

The race *ammophilus* may be restricted to the sand dunes around Samalayuca, Chihuahua. However, there are other sand dunes, quite extensive, to the west of Samalayuca, near Medanos and Barreal, Chihuahua. Possibly spotted ground squirrels of the subspecies *C. s. ammophilus* occur there. In parts of southern Chihuahua, Colima, and Durango, there are large, long-established dunes. Whether spotted ground squirrels, *Citellus spilosoma,* occur in these is not known, and if they should, the degree of paleness is unknown. Some specimens in our collections taken short distances from some of these dunes indicate that they are slightly paler than most *pallescens.* These specimens, however, are not as pale as *ammophilus.*

Specimens examined.—**Chihuahua**: 5½ mi. N. Samalayuca, 1; 4.8 mi. S Samalayuca, 1.

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PROCEEDINGS
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A NEW CRAYFISH OF THE GENUS PROCAMBARUS FROM ALABAMA[1] (DECAPODA, ASTACIDAE)

Horton H. Hobbs, Jr.
University of Virginia
and Margaret Walton
Danville, Virginia

The new crayfish described below was collected from eight localities in the vicinity of Montgomery, Alabama, some 200 miles east of the single locality in which its closest relative, *Procambarus jaculus*, was found. The two species occur at approximately the same degree of latitude, and there is evidence that both are secondary burrowing species (Hobbs, 1942: 20), associated with temporary bodies of water.

We have named this crayfish in honor of our good friend, Dr. Ivey F. Lewis, former Director of the Mountain Lake Biological Station, who has aided and encouraged us in our studies for many years.

Procambarus lewisi, sp. nov.

Diagnosis.—Rostrum without marginal spines; postorbital ridges weak and without spines or tubercles; suborbital angle weak or rounded; lateral surface of carapace tuberculate with a single one larger than others immediately caudal to cervical groove; areola 13 to 24 times longer than broad and constituting 32.1 to 37.3 per cent of entire length of carapace. Simple hooks present on ischiopodites of third pereiopods in male, those on fourth bituberculate or knobbed. Palm of chela not bearded but with a row of seven to 11 tubercles. First pleopod of first form male with a slight shoulder on cephalic margin at base of distal seventh; mesial process non-corneous, slender, and extending caudodistad beyond the tips of the other terminal elements; cephalic process slender, lying cephalolateral to the central projection, tip corneous, and projecting distally; caudal process, a corneous, plate-like, sinuous projection, extends almost beak-like, and directed caudodistad but tilted slightly laterad. laterodistally across the caudolateral portion of the terminal end of pleopod; central projection, the largest of the terminal elements, corneous, Annulus ventralis movable with a prominent pair of caudolaterally directed arms; central area elevated (ventrally) with a longitudinal furrow in cephalic half; sinus, originating in cephalic furrow, S-shaped caudally.

Holotype Male, Form I.—Body subovate with the greatest length in the dorso-ventral plane; abdomen and carapace subequal in length (31.5 and 31.4 mm.). Height in region of caudodorsal margin of cervical groove slightly less than width; greatest width of carapace slightly caudal to caudodarsal margin of cervical groove.

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[1] Contribution from the Mountain Lake Biological Station and the Department of Biology, University of Virginia.

Areola about 23.4 times longer than broad with one or two punctations in narrowest part. Cephalic section of carapace about 1.7 times as long as areola (length of areola about 37.9 per cent of entire length of carapace).

Rostrum without marginal spines; margins only slightly elevated, a little thickened basally, and converging to a small indistinctly delimited acumen. Upper surface subplane basally and slightly concave cephalically with scattered punctations and with a row of them mesial to margins. No carina present. Postorbital angle obtuse and rounded. Subrostral ridges evident along basal third of rostrum. Branchiostegal spine very small but acute. Lateral surface of carapace granulate and with one tubercle slightly larger than other granulations on each side just caudal to cervical groove. Dorsal surface of carapace punctate. Cephalic section of telson with two spines in each caudolateral angle.

Epistome (Fig. 10) broader than long, its margins with a few small tubercles; cephalic border without a median projection. Antennules of the usual form with a small spine on lower surface of basal segment. Antennae broken. Antennal scale (Fig. 11) broad; broadest slightly distal to mid-length; lateral portion inflated, slightly convex laterally, and terminating distally in an acute spine; total length almost half that of areola (5.6 and 11.7 mm.).

Left chela (Fig. 7) with palm inflated and with setiferous squamous tubercles present on all surfaces. Inner margin of palm with a row of nine tubercles; below this row another consisting of seven tubercles; tubercles above this row somewhat more irregularly arranged; prominent tubercle on lower surface of palm at base of dactylopodite. Both fingers with moderately well defined, longitudinal, polished ridges above and below. Opposable margin of immovable finger with a row of 11 tubercles, the fourth from the base largest; below the distalmost tubercle in this row lies a very prominent one and a smaller one distal to the latter. Opposable margin of dactylopodite with two rows of tubercles, an upper one of 17 very small ones and a lower of nine; lower row originates at distal end of proximal fourth of finger and the proximal tubercle is largest. Crowded minute denticles present along distal half of opposable margins of both fingers and interspersed among the proximal tubercles. Setiferous punctations covering both fingers except for polished ridges and at base of dactylopodite where small tubercles are present.

Carpopodite of first left pereiopod tuberclate mesially and punctate on other surfaces. In addition to the usual arc of large tubercles along distal border, several smaller ones on mesial surface proximal to the large mesial one. Upper surface with a broad shallow oblique furrow. Meropodite tuberculate above, below, and mesiodistally; one tubercle on upper distal surface larger than others on upper surface; lower surface with the usual two rows, although lateral row somewhat irregular and both rows flanked by others on each side; the more regular mesial row consists of 15 tubercles. Lower surface of ischiopodite with a row of five tubercles.

Ischiopodites of third and fourth pereiopods with hooks (Figs. 8, 9); that on third simple and that on fourth bituberculate; neither opposed by a knob-like prominence on corresponding basipodite. Coxopodite of fourth pereiopod with a caudomesially projecting knob on caudomesial angle, and that of fifth with a ventrally directed projection near caudomesial angle.

First pleopods (Figs. 1, 5) symmetrically arranged and extending to coxopodite of third pereiopod when abdomen is flexed. Tip terminating in four distinct parts, three of which are corneous. No setae on distal half of appendage. For description see *Diagnosis.*

Morphotypic Male, Form II.—Differs from the holotype in the following respects: suborbital angles obsolete; epistome with a small cephalomedian projection; antenna extends caudad to base of third abdominal segment; inner margin of palm of chela with a row of seven or eight tubercles; opposable margins of fingers of chela with a single row of minute denticles, as opposed to crowded ones; hooks and prominences on proximal podomeres of pereiopods all reduced, and hook on ischiopodite of fourth pereiopod with no indication of the bituberculate condition. First pleopod (Figs. 2, 4) with all terminal elements represented; however, none corneous, and all shortened. An oblique transverse suture is present in the basal half of the appendage. See measurements.

Allotypic Female.—Differs from the holotype in the following respects: epistome broadly triangular with a small cephalomedian projection; inner margin of palm of chela with a row of eight tubercles; opposable margins of fingers of chela with a single row of minute denticles as in morphotype, but forming a knife-like edge; cephalic section of telson with three spines in the caudosinistral angle. Annulus ventralis (Fig. 6) movable and not covered in part by sternum immediately cephalic to it. See Diagnosis for description; also see measurements.

Measurements.—(In. mm.).		Holotype	Allotype	Morphotype
Carapace:	height	15.1	10.9	10.6
	width	15.5	10.9	10.6
	length	31.4	22.5	22.2
Areola:	width	0.5	0.4	0.4
	length	11.7	7.9	7.5
Rostrum:	width	5.1	4.0	3.9
	length	7.0	6.5	5.4
Chela:	length of inner margin of palm	11.1	4.2	4.2
	width of palm	8.9	3.9	3.9
	length of outer margin of hand	31.3	12.8	12.6
	length of dactyl	18.2	7.6	7.1

Type Locality.—Roadside ditch 18.8 miles east of Montgomery, Macon County, Alabama, on Route 80. Here the ditch is some six feet wide and the muddy water ranged from a few inches to more than four feet in depth in some places. Grasses grew along the margins of the ditch and filamentous algae were abundant. At 12:45 P.M. on April 16, 1958, the temperature of the water was 12°C. The only other crayfish collected in this locality was *Procambarus acutissimus* Girard.

Disposition of Types.—The holotype, allotype, and morphotype are deposited in the U. S. National Museum (nos. 102467, 102468, and 102469, respectively). The paratypic series consists of 3♂♂, form II, 9♀♀, 13 juvenile ♂♂, and 7 juvenile ♀♀ in the collection of the senior author at the University of Virginia, and 1♂, form I, 4♂♂, form II, 8 juvenile ♂♂, and 4 juvenile ♀♀ are in the Tulane Collection.

Range.—In addition to the type locality, specimens are available from the following localities in Alabama. *Lowndes County*: Roadside ditch, 3.9 mi. S.W. of intersection of Rts. 11 and 80 on Rt. 11; Stream 32.4 mi. S. of Montgomery on U. S. Hwy. 31. *Montgomery County*: Roadside ditch 12.8 mi. S. of Montgomery on U. S. Hwy. 31; Roadside ditch 18.2 mi. E. of Montgomery on U. S. Hwy. 80; 2.5 mi. S.E. of junction of U.S. Hwy. 231 and Rt. 6; 3 mi. E. of Montgomery. *Macon County*: Stream and roadside ditch 0.8 mi. S. of Ft. Davis on U. S. Hwy. 29.

Relationships.—*Procambarus lewisi* has its closest affinities with *P. jaculus* Hobbs and Walton (1957: 48) but may be distinguished from it by the structure of the first pleopod and the bituberculate or knobbed hooks on the ischiopodites of the fourth pereiopods of the first form male and by differences in the annulus ventralis of the female. The antennal scale is also broader in *P. lewisi* than in *P. jaculus.*

Remarks.—There is little variation among the 52 specimens available; most of the crayfish are comparatively small and a discussion of variations within the species must await the procurement of a series of larger, unquestionably mature, specimens.

It seems probable that *P. lewisi* is a secondary burrower although most of the specimens were taken from open water. The fact that the majority of the individuals collected were young and were in company with other adult crayfish suggests that the more mature specimens were in burrows. Other species related to *P. lewisi* are known to be secondary burrowers—*P. planirostris* Penn (1953: 71), *P. hybus* Hobbs and Walton (1957: 39), and *P. mancus* Hobbs and Walton (1957: 44); also, the only specimens available of *P. jaculus* were taken from temporary water in a roadside ditch.

ACKNOWLEDGMENTS

We wish to express our appreciation to Dr. George H. Penn who has permitted us to examine the specimens of *P. lewisi* in the Tulane Zoological Collection and to Mr. Thomas L. Johnson of the University of Virginia who assisted in collecting most of the specimens on which this description is based.

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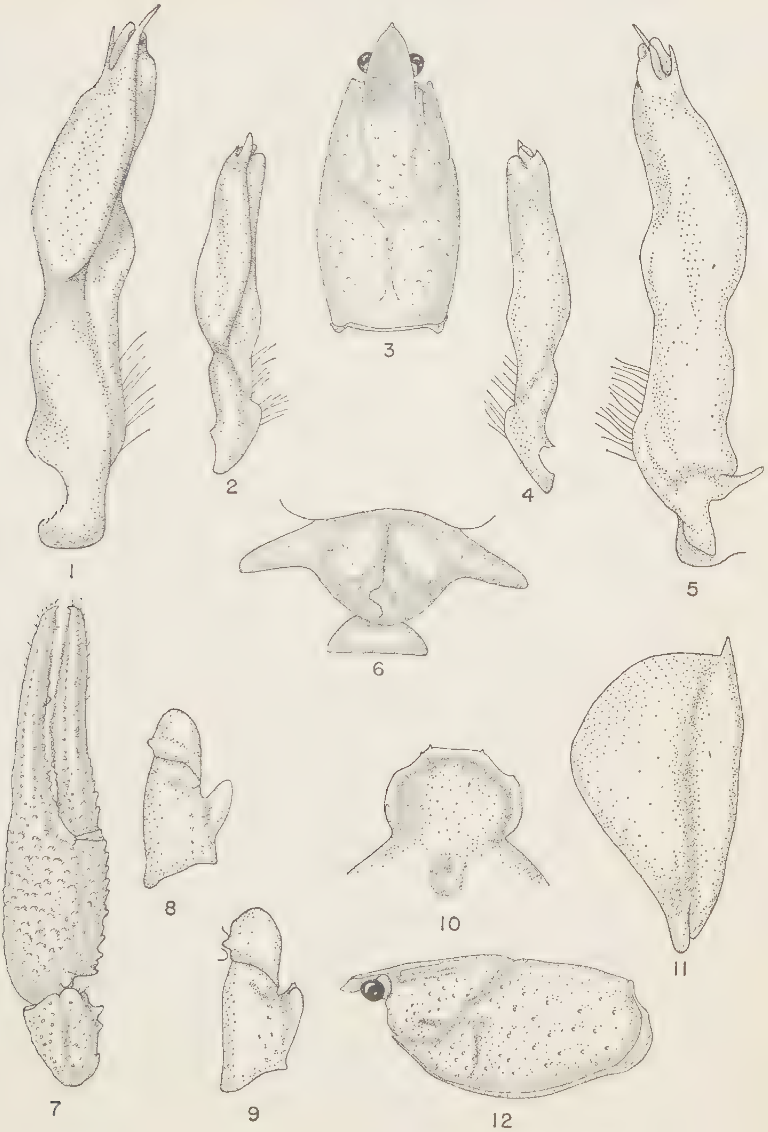

Explanation of Plates

Procambarus lewisi

Fig. 1. Mesial view of first pleopod of holotype.

Fig. 2. Mesial view of first pleopod of morphotype.

Fig. 3. Dorsal view of carapace of holotype.
Fig. 4. Lateral view of first pleopod of morphotype.
Fig. 5. Lateral view of first pleopod of holotype.
Fig. 6. Annulus ventralis of allotype.
Fig. 7. Distal podomeres of cheliped of holotype.
Fig. 8. Basipodite and Ischiopodite of third pereiopod of holotype.
Fig. 9. Basipodite and Ischiopodite of fourth pereiopod of holotype.
Fig. 10. Epistome of holotype.
Fig. 11. Antennal scale.
Fig. 12. Lateral view of carapace of holotype.

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PROCEEDINGS
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A NEW SPECIES OF SOUTH AMERICAN BROCKET, GENUS *MAZAMA* (CERVIDAE)

By Philip Hershkovitz
Curator of Mammals, Chicago Natural History Museum

The dwarf deer of the Amazonian flanks of the Andes of northern Bolivia and southern Peru variously recorded in scientific literature as pudus (*Pudu mephistophiles*) or as indeterminate brockets, prove to be representatives of a hitherto unnamed species of *Mazama*.

Thanks are here expressed to the authorities of the American Museum of Natural History for permission to describe the specimen here selected as type, and to the authorities of the United States National Museum for the loan of additional material.

The following abbreviations are used in the list of specimens examined:

AMNH = American Museum of Natural History
CNHM = Chicago Natural History Museum
USNM = United States National Museum

Mazama chunyi, new species

[?] *Pudua mephistophelis* [sic], Matschie (not de Winton), 1899, Sitzb. Gesellsch. Naturf. Fr. Berlin, p. 130—part, BOLIVIA.

Pudu mephistophiles, Sanborn (not de Winton), 1952, Mus. Hist. Nat. "Javier Prado," (A), Zool., no. 12:8—PERU: Chuntahuampa, Sandia, Puno; San Juan, Sandia, Puno.

[?] *Pudua* sp., Eaton, 1916, Mem. Connecticut Acad. Arts Sci., 5:15—PERU: Machu Picchu, Cusco (scapula in Indian burial cave).

Pudua [sp.], Tate, 1931, Journ. Mammal., **12**:252—BOLIVIA: "temperate forest of the eastern slopes of the Cordillera Real."

Mazama species, Thomas, 1920, Proc. U.S. Nat. Mus. **58**:242—PERU: Santa Ana, Cusco, 3480 feet.

Mazama sp., Sanborn, 1951, Publ. Mus. Hist. Nat. "Javier Prado," (A), **6**:25—PERU: Tío, Marcapata, Cusco, 2000 meters.

Type.—Male, juvenal, skin and skull, American Museum of Natural History no. 73098; collected 28 May, 1926, by G. H. H. Tate.

Type locality.—Cocopunco, a site on the eastern slope of the Cordillera Real on the road to Mapiri, La Paz, Bolivia; altitude, about 3200 meters.

Distribution.—The Andes of northwestern Bolivia and southeastern Peru in the headwaters of the Río Beni (La Paz, Bolivia), Río Madre de Dios (Puno and Cusco, Peru), and the Río Urubamba (Cusco).

Diagnosis.—Smallest species of *Mazama*, size as in *Pudu pudu*.

Description.—General color of head and body cinnamon brown to rufous brown, shoulders and outer side of limbs more uniformly brown than back; individual cover hairs of back drab basally, buff or rufous terminally except for the fine dark brown tips; inner side of ears, lateral narial patch and mental patch white; throat, chest, inner sides of fore and hind legs buff to ochraceous-tawny; belly white; tail short, like rump above, sharply defined white beneath; external opening of preorbital gland small; tarsal and metatarsal tufts present and concealing corresponding glands; fore and hind hoofs long and slender, their greatest width slightly more or less than one-half greatest length; dew claws longer than wide.

Nasals at midline shorter than frontals at midline; diastema shorter than alveolar length of upper cheek teeth; antorbital fossa shallow or dish-shaped, without fenestrations; superior portion of ascending ramus of premaxillary reaching lateral tips of nasals; long axis of antorbital vacuity oblique; area of vacuity less than one-half plane area of facial plate of lacrymal; greatest supraorbital breadth less than width of braincase (Plates 1, 2).

Antlers as usual in the genus, spike-like and, judged by a fragmentary skull from Santa Ana, Peru, short, delicately formed, directed straight back in line with dorsal plane of forehead, burr comparatively simple and little differentiated from pedicle.

Coloration of type.—Back and sides of head and body wood brown ticked with buff; juvenal spot pattern faintly defined on lower back; lateral band, chest and inner sides of thighs ochraceous buff, belly white; upper surface of muzzle, forehead, crown, outer side of ears, chin and lips brown, inner side of ears white; lateral narial patch trimmed in type, white in female from Tío, Peru; mental patch white, throat ochraceous buff; limbs brown.

Variation.—Peruvian specimens from San Juan (1500 meters) and Tío (2000 meters) are darker, more reddish brown on dorsal surface, more reddish on underparts, and with pelage harsher, than the type. The hairs at anterior base of each ear are whorled in the Tío specimen, and the lower anterior border of each ear presents a white patch. A trimmed pelt from Chuntahuampa, Peru (2500-3000 meters), is intermediate in color and texture of pelage between the specimens from lower altitudes and the type from 3200 meters above sea level.

Available material suggests that the difference in color between the pale holotype of the temperate zone of the Andes in Bolivia and the darker individuals of the subtropical zone of the same slope of the Andes in Peru, is clinal.

Measurements (in millimeters).—Those of the type, a juvenal with milk premolars and unerupted third molars, followed by the external measurements of an adult ♀ from Tío, Peru, and the cranial measurements of an adult ♀ from San Juan, Peru. Head and body, 706, 720; tail, 24,—; hind foot, 124, 164; ear,—, 63 (notch); greatest length of skull, 117, 146; zygomatic breadth, 60, 66.9; greatest supraorbital breadth, 35, 40; width of braincase, 43.2, 47.7; nasals 27.1, 37.9; diastema, 30.2, 40.5; cheek teeth, 37.8 (dpm^2—m^2), 44.7 (pm^2—m^3); antlers, from base of burr, in a male from Santa Ana, Peru, 51 (right), 52 (left).

Comparisons.—Though pudu-like in size and general appearance *Mazama chunyi* differs from true pudus (*Pudu pudu* Molina and *P.*

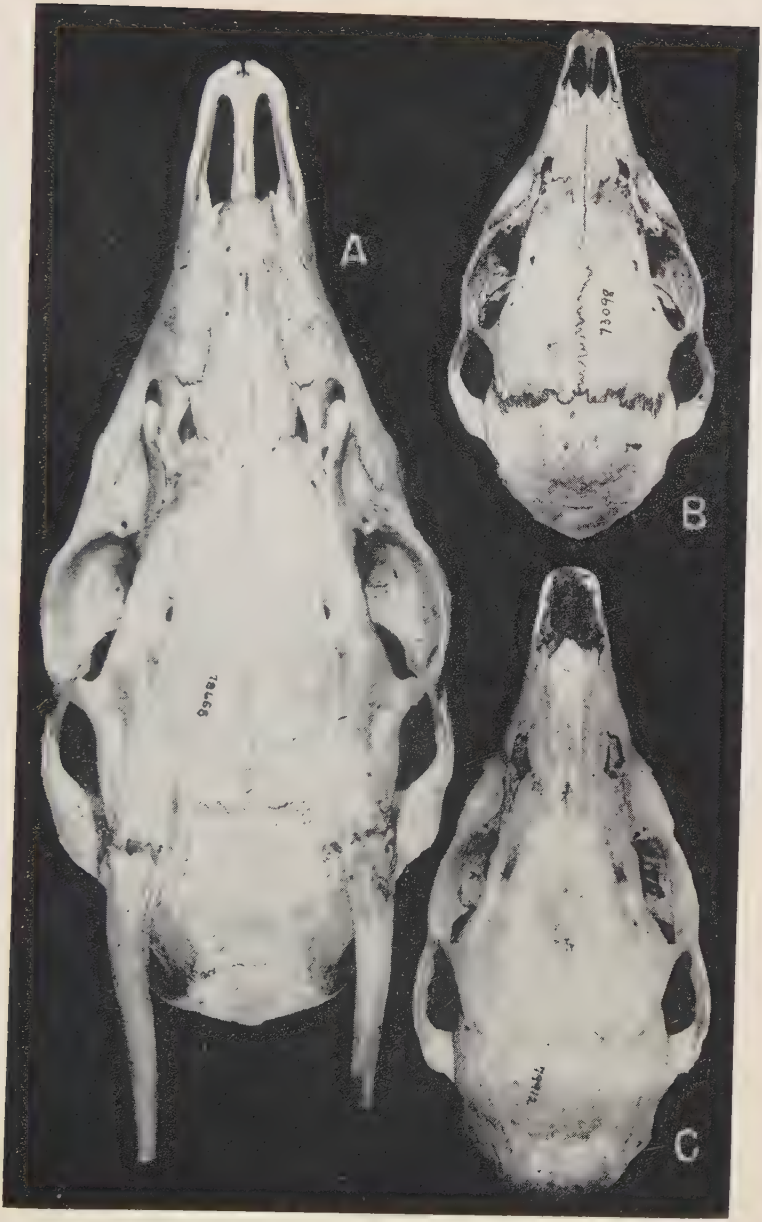

Plate 1

mephistophiles de Winton) chiefly by the following characters: External cuneiform present as a discrete tarsal bone; first incisor (Plate 5B) broadly spatulate, its greatest width more than combined width of second and third incisors; presence of white mental and narial patches; tail distinguishable from rump, its undersurface sharply defined white. The preorbital gland in *M. chunyi* is small, the preorbital fossa shallow, as in *Pudu mephistophiles*, while in *Pudu pudu* the gland is large, the fossa deep or bowl-shaped (Plate 3A-D).

The chunyi, or dwarf, brocket is distinguished from the much larger hed brocket, *Mazama americana*, the only sympatric congener, by absence of whorl or reversed direction of hair growth on nape, absence of supraorbital streak or circumorbital band, and by the much shorter tail. The brown brocket, *Mazama gouazoubira*, averages smaller than the red, but is still appreciably larger than *M. chunyi*, paler throughout, with tail very much longer, supraorbital streak or spot usually present and hoofs broader. *Mazama rufina* described from the Andes of Ecuador, but not known to occur in Peru or Bolivia, differs from *M. chunyi* by its deeper red or reddish-black body color, contrastingly darker metapodials, and the extremely large preorbital gland with the correspondingly deep, bowl-shaped preorbital fossa as in *Pudu pudu* (Plate 3D).

Habitat and habits.—The discovery of the type specimen of *Mazama chunyi* is told by Tate (1931, Journ. Mammal., 12:252) as follows: ''These diminutive deer have been recorded only occasionally. The temperate forest of the Cordillera Real (Bolivia) contains numbers of this animal. In the tangled moss-hung woods signs of them were frequent in the form of foot-prints and droppings. In one valley-head where they seemed most plentiful we set out a regular mine-field of steel traps and managed in this way to catch one.''

Presence of the chunyi brocket in southeastern Peru was suspected by Mrs. Hilda Heller a year before she actually sent two specimens to the Chicago Natural History Museum. According to her field notes dated 1950, ''there is a tiny red deer with spike horns in the hot and cold zones in forest land and in brush land in the Sandia and Tambopata valleys. It is called *chunitaruca, chuni* meaning small and taruca [*or taruga*] meaning deer.'' In her notes for 1951, Mrs. Heller corrected the spelling of the local name of the deer to *chuñitaruca.* She gives this account of the first specimen secured. ''Chuñitaruca. M194♀ [CNHM 79912] . . . found in the Tambopata River at San Juan. The river had been high. The finders believed the hair [of most of the hide] had been torn off by the current or the friction of the rocks; the meat was considered fresh enough to eat. When I received the skin it was really dry, but I suspect, from a slight bloom on the moist part of the neck, that it would not stand tanning. Altitude or origin unknown. The species occurs at San Juan, 5000 feet, and at Sandia, 7,500 feet, perhaps higher.'' in addition to the damaged hide, Mrs. Heller salvaged the skull intact and the foot bones.

The second specimen, a hide with the head, limbs and tail trimmed off, was purchased in Sandia from a woman ''who had it from her people in Chuntahuampa near Pucarimayo on the old road to Valle Grande at a fairly high altitude. They called it *chuñitaruca.*''

Mrs. Heller adds that ''December is the month in which [chunyi

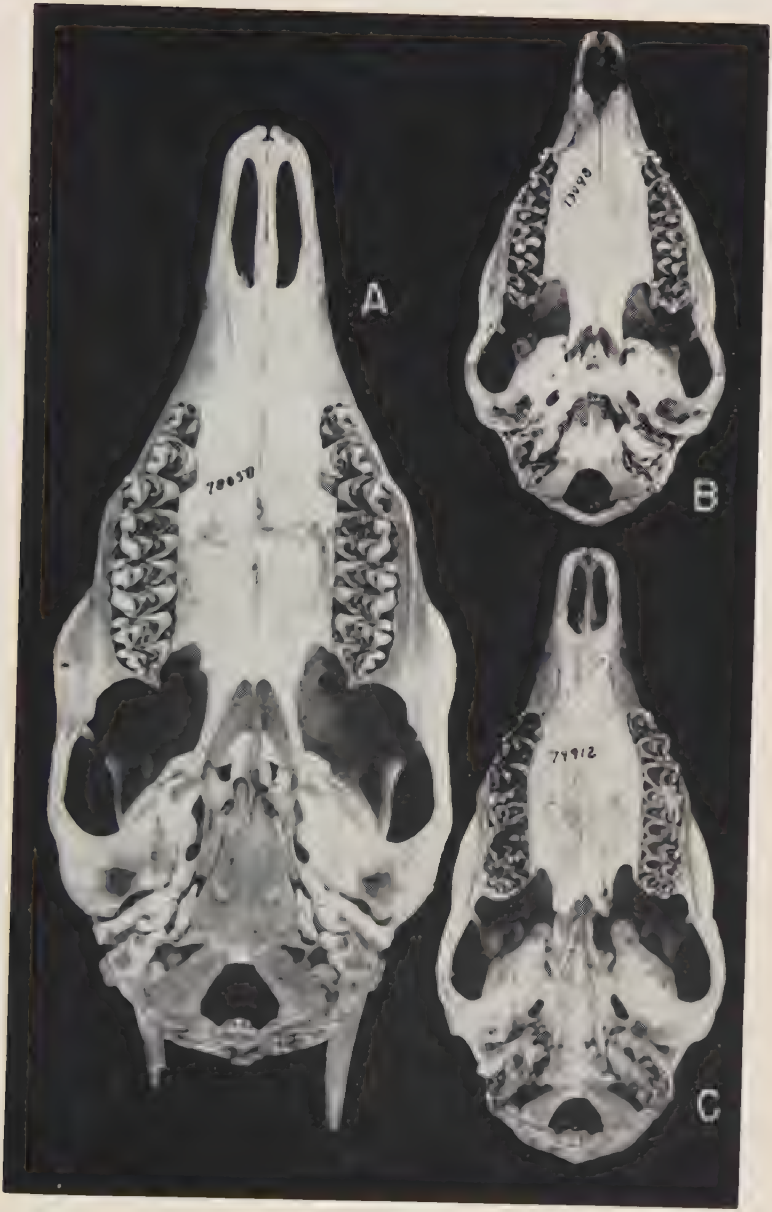

Plate 2

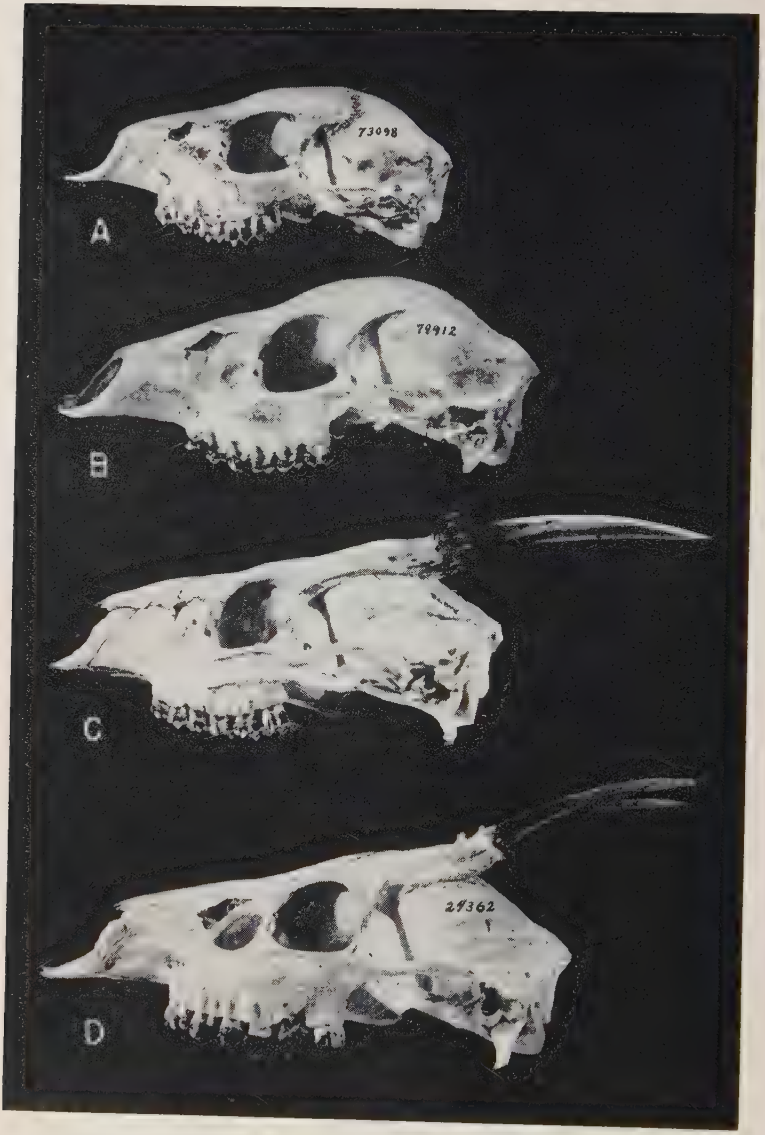

Plate 3

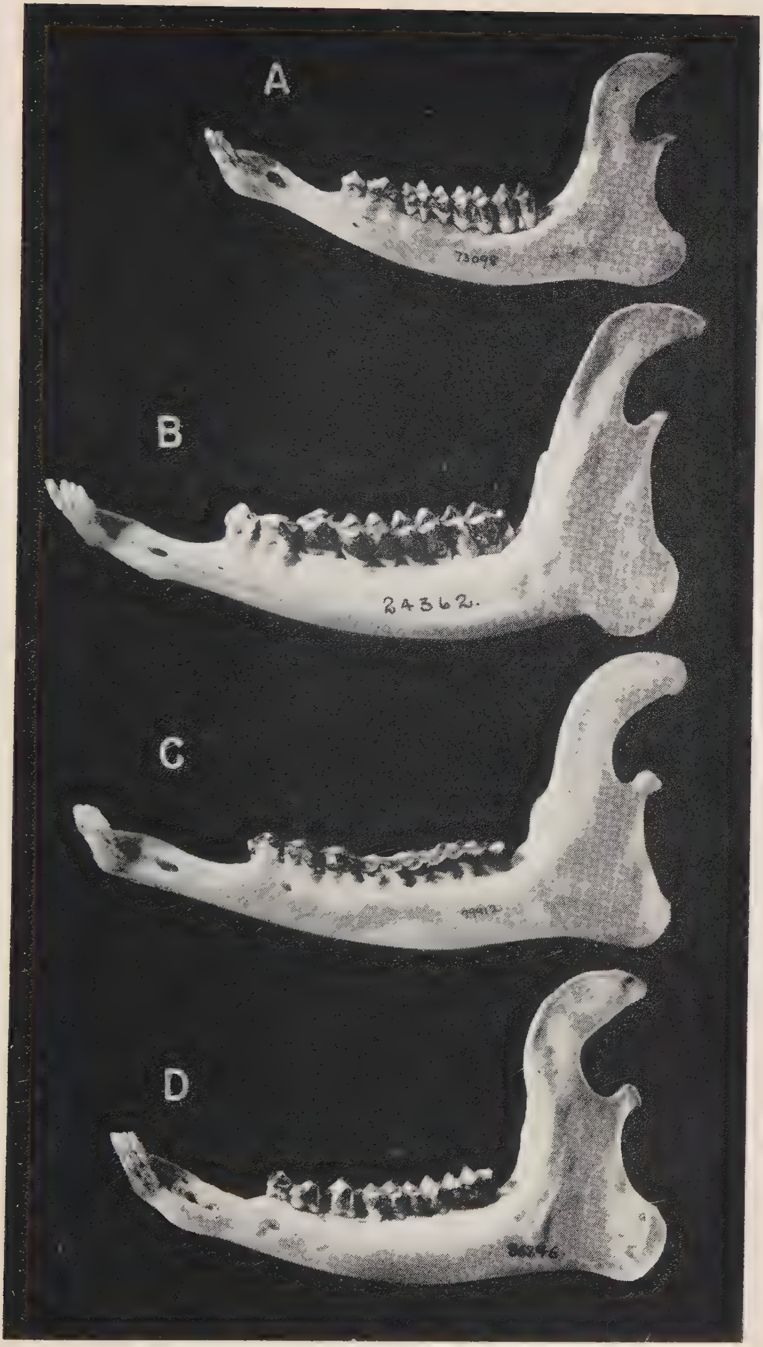

Plate 4

brockets] are usually obtained, for it is then that they come to eat potatoes. Because of their small size (weight about 25 pounds), they are not hunted by sportsmen for meat, but by the farmers in order to protect the potatoes.''

Remarks.—The external, osteological and dental characters of *Mazama chunyi* used in the above comparisons with the two known species of *Pudu*, serve to distinguish all brockets from pudus.

Present material representing *Mazama chunyi* is fragmentary but each part whether skin, skull or foot bones, is identifiable as representing an extremely small species of *Mazama*. The holotype, a juvenal male with the second upper molars not quite fully in place and without trace of antler pedicles, is the only specimen with both skin and skull in good condition. The state of each of the remaining specimens is described in the following section.

Specimens examined.—5. BOLIVIA: Cocopunco, La Paz, the type (AMNH); PERU: Tío, near Marcapata, Quispicanchi, Cusco, skin (CNHM); San Juan, Río Tambopata, Sandia, Puno, trimmed and partially bare skin, skull, foot bones (CNHM); Chuntahuampa, near Pucarimayo, Río Huari Huari (upper Río Inambari), Sandia, Puno, 1 trimmed hunter's pelt (CNHM); Santa Ana, Río Urubamba, Cusco, posterior half of skull with antlers intact (USNM).

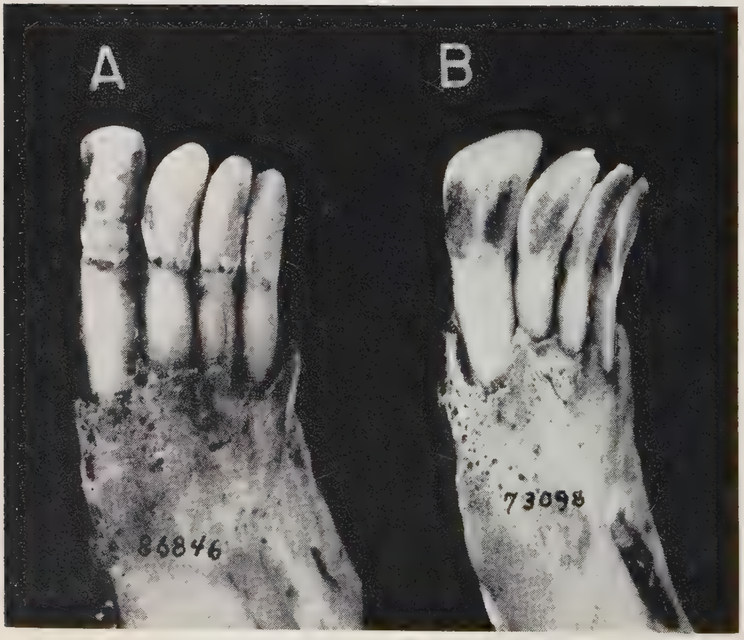

Plate 5.

Explanation of Plates.

Plate 1. Dorsal aspect of skulls of
  A, *Mazama americana whitelyi* (Quincemil, Marcapata, Cusco, Peru).
  B, *Mazama chunyi* (type, Cocopunco, Bolivia);
  C, *Mazama chunyi* (San Juan, Peru).
All figures slightly over ½ × natural size.

Plate 2. Ventral aspect of same skulls shown in Plate 1.

Plate 3. Side view of skulls of
  A, *Mazama chunyi* (type);
  B, *Mazama chunyi* (San Juan, Peru);
  C, *Pudu mephistophiles* (Malvasá, Cauca, Colombia);
  D, *Pudu pudu* (Chiloé Island, Chile).
All figures slightly under ½ × natural size.

Plate 4. Left mandibles of
  A. *Mazama chunyi* (type);
  B. *Pudu pudu;*
  C. *Mazama chunyi;*
  D. *Pudu mepjhistophiles.*
All figures slightly over ½ × natural size.

Plate 5. Lower front teeth (approximately ×4) of
  A, *Pudu mephistophiles;*
  B, *Mazama chunyi* (type).

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PROCEEDINGS

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A NEW GENUS AND TWO NEW SPECIES OF LEAFHOPPERS FROM SOUTH AMERICA (HOMOPTERA: CICADELLIDAE: NEOCOELIDIINAE)

By James P. Kramer

Entomology Research Division, Agricultural Research Service,
United States Department of Agriculture
and Rauno Linnavuori
Turku, Tyttölyseo, Finland

The new leafhoppers characterized in this paper are rather notable insects. The collection localities indicate that these species are jungle dwellers in the hinterlands of South America. They represent the largest members of the subfamily Neocoelidiinae as yet described. Superficially, their habitus is reminiscent of some of the larger Neotropical Gyponinae. However, this similarity fades with a closer examination.

Megacoelidia new genus

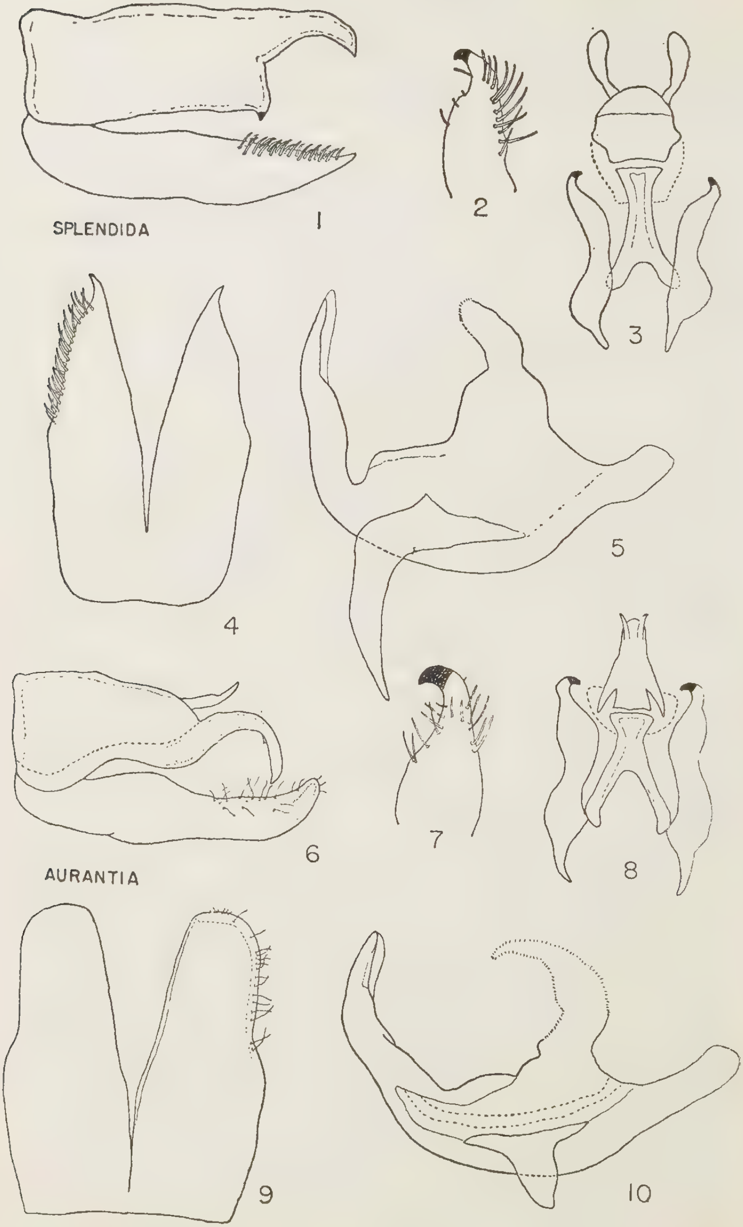
Type of genus **Megacoelidia splendida** new species

While *Megacoelidia* does not appear to be very close to any described genus, it has the exceedingly long antennae plus the carina separating the face and crown which represents a condition found in several genera of Neocoelidiinae.

Large robust leafhoppers. Head comparatively small, slightly less than two-thirds as wide as pronotum. Eyes rather small. Crown subquadrate, much wider than long, produced beyond eyes and distinctly concave. Posterior margin of crown carinate, lateral margins subcarinate. A distinct carina running transversely between ocelli which are on the anterior margin of the crown. Face long, with clypellus exceeding genae distally. Clypellus parallel sided and medianly subcarinate. Oblique ledge above each antennal pit well developed. Antennae longer than body. Pronotum large, slightly indented on posterior margin. Scutellum large and triangular. Tegmina long, with venation similar to that of other Neocoelidiinae.

Coloration in known species deep orange to orange with a narrow black border on apex of tegmina.

Male genitalia. Plates large and fused basally. Valve lacking. Pygofer variously modified distally with elongations or processes. Connective



Megacoelidia splendida (figs. 1-5) and *Megacoelidia aurantia* (figs. 6-10). 1 and 6, lateral view of pygofer and male plate; 2 and 7, apex of style; 3 and 8, ventral aspect of styles, connective, and aedeagus; 4 and 9, male plates; 5 and 10, lateral view of aedeagus.

Y-shaped and clearly articulated with the aedeagus. Style slender with one apical lobe. Aedeagus stout with apical portion recurved. Gonopore opens dorsally and below the apex.

Megacoelidia splendida new species

Length.—Male 13 mm.

Coloration.—Venter and legs pale orange. First tibia with a black stripe its length on anterior face. Second tibia with a black stripe on basal half. Third tibia with an elongate basal spot. Face pale orange. Scape and pedicel light brown, flagellum dark brown. Crown orange. Pronotum mainly orange, tending to yellow cephalad and with a narrow black border on posterior margin. Scutellum yellow. Tegmina orange, basally of a slightly darker shade, with a narrow black border on apex.

Male genital structures.—(figs. 1-5) Male plates pointed apically, points turning laterad. Apex of pygofer with a dorsal extension and ventral tooth. Aedeagus stout with a pair of long lateral processes and recurved apically. Gonopore opens dorsally at base of recurved portion.

HOLOTYPE Male, Esperanza, Brazil, State of Amazonas, August 9, 1920. U.S.N.M. type number 64652. Female unknown.

The black posterior margin of the pronotum and the many differences in the genitalia will separate this species from the only other known member of the genus.

Dr. Henry Dietrich of Cornell University very kindly supplied the following original collection data: ''Brazil, Amazonas. Down the Rio Solimões from Brazilian frontier, Tabatinga and Esperanza and mouth of Rio Javari, (early Aug. 9) to Capacetes, São Paulo de Olivença and beyond.'' Rio Solimões is that portion of the Amazon River bordering the southernmost tip of Colombia and runing into Peru. Both Tabatinga and São Paulo de Olivença are towns on the Rio Solimões in Brazil. Tabatinga is very near the Colombian border and is situated directly southeast of Leticia, Colombia. Rio Javari is the river which separates Brazil and Peru on the northern portion of their common border. The only ''Esperanza'' in this section of Brazil is Boa Esperança on the Jandiatuba River which is situated slightly east and south of São Paulo de Olivença.

Megacoelidia aurantia new species

Length.—Male 13 mm.

Coloration.—Venter and legs pale orange. First tibia like *splendida.* Second and third without black markings. Face and antennae like *splendida.* Crown, pronotum, scutellum, and tegmina a uniform deep orange. Tegmina with a narrow black apical border as in *splendida.*

Male genital structures.—(figs. 6-10) Male plates with apex broadly rounded and blunt. Apex of pygofer with a short dorsal process and a long decurved ventral process. Aedeagus stout, apex recurved, with a pair of short lateral processes. Gonopore opens dorsally near base of recurved portion.

HOLOTYPE Male, Chaparé (Yungas), Bolivia, 1-49, Bridarolli. U.S.N.M. type number 64653. Female unknown.

The lack of a black posterior margin on the pronotum and the distinctive genital structures will separate *aurantia* from *splendida.*

Chaparé is the name of a river, and Yungas is a general region. Both of these are now included in the Bolivian state of Cochabamba.

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PROCEEDINGS

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A SYNOPSIS OF THE OSTRACOD (CRUSTACEA) GENUS *CYPRIDOPSIS* WITH THE DESCRIPTIIN OF A NEW SPECIES[1]

Edward Ferguson, Jr.

Grambling College, Grambling, La.

Brady (1867) established the genus *Cypridopsis* and designated *Cypridopsis vidua* (=*Cypris vidua* O. F. Müller 1776) the type species. The genus includes ostracods of the family Cypridae that have the following description: Shell high, tumid; valves approximately the same size; natatory setae of both antennae well developed; terminal podomere of the maxillary palp longer than wide; furca reduced to a base, tapering distally to a seta.

Brady and Norman (1896) proposed the genus *Pionocypris* for ostracods with the left valve larger than the right, but otherwise essentially similar in general morphology to members of the genus *Cypridopsis.* They designated *C. vidua* the genotype of the new genus *Pionocypris* and restricted the genus *Cypridopsis* to individuals having the right valve longer than the left. The literature contains instances in which *Pionocypris* has been confused through misspelling with *Prionocypris* Brady and Norman 1896.

The genus *Pionocypris* is of questionable validity. An examination of the sketches and a review of the descriptions of the species of *Pionocypris* suggest that they may properly be assigned to the genus *Cypridopsis.* In view of the foregoing it is proposed that *Pionocypris* Brady and Norman 1896 be absorbed into the older genus *Cypridopsis* Brady 1867.

Representatives of the genus *Cypridopsis* are widely distributed. Of the forty two species listed in this paper, twenty one have type localities in Africa, eleven are from North America, and five have been described from Europe. Several of the species reported by Sars (1924a) from Africa, and the South American species described by Sars (1901) were transported in dried mud to Sweden where they were cultured in aquaria.

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[1] Acknowledgment is made of the assistance of Miss Alice Boatright, Staff Artist, Department of Zoology, Universiy of Illinois, who prepared the drawings, and of Mrs. Corinne A. Ferguson who prepared specimens for study.

Members of the genus range in length from 0.35 mm. for *C. yucatanensis* Furtos 1938, probably the smallest freshwater ostracod known, to 0.90 mm. for *C. aldabrae* Müller 1898. Apparently all members of the genus are free-living. However, Deschiens, Lamy and Lamy (1953) report that *C. hartwigi* Müller 1900 has been observed preying upon snails of the species *Bullinus contortus* Michaud 1829 and *Planorbis glabratus* Say 1828.

Wherever possible the length, height, and color of the valves and the geographical distribution have been recorded for a species. There are numerous instances in which investigators neglected to give full descriptions of their species. Indeed, the scanty morphological characteristics upon which several species of *Cypridopsis* have been established may reasonably lead to some doubt as to their validity.

SPECIES OF CYPRIDOPSIS

C. aculeata (Costa 1852)
  Size: Length of female 0.72 mm. Males unknown.
  Color: Dark bluish-green.
  Distribution: Europe, Iceland, Central Asia, Africa.

C. aldabrae Müller 1898
  Size: Length of female 0.90 mm. Males smaller than females.
  Color: Not recorded.
  Distribution: Aldabra, East Africa; Southwest Africa.

C. brevis Sars 1924a
  Size: Length of female 0.50 mm. Males unknown.
  Color: Bright emerald green.
  Distribution: Bergvliet Flats, South Africa. Cultured in an aquarium from dried mud.

C. brevisetosa Klie 1943
  Size: Length of female 0.70 mm; height 0.35 mm. Length of male 0.63 mm; height 0.34 mm.
  Color: Bright green in region of adductor muscles; ends and ventral margin are yellowish-brown.
  Distribution: Morocco.

C. clavata Sars 1924a
  Size: Length of female 0.78 mm. Males unknown.
  Color: Not recorded.
  Distribution: South Africa.

C. dadayi Mehes 1913
  Size: Length of female 0.58 mm; height 0.32 mm. Males unknown.
  Color: Brownish-green.
  Distribution: Bogota, Colombia.

C. echinata Müller 1909
  Size: Length of female 0.72 mm. Males unknown.
  Color: Dark green.
  Distribution: South Africa.

C. elizabethan Sars 1924a
Size: Length of female 0.70 mm. Males present, but less numerous than females.
Color: Light yellowish-green with patches of darker hue in dorsal region.
Distribution: South Africa. Cultured in an aquarium from dried mud.

C. flavescens Sars 1901
Size: Length of female 0.63 mm. Males unknown.
Color: Not recorded.
Distribution: Argentina. Cultured in aquarium from dried mud.

C. fuhrmani Mehes 1913
Size: Length of female 0.68 mm; height 0.41 mm. Males unknown.
Color: Greenish-yellow.
Distribution: Bogota, Colombia; Argentina.

C. glabrata Sars 1924a
Size: Length of female 0.87 mm. Males smaller than females.
Color: Dark olivaceous.
Distribution: South Africa. Cultured in an aquarium from dried mud.

C. gregarina Sars 1924a (= *C. triquetra* G. W. Müller)
Size: Length of female 0.80 mm. ''Male of somewhat smaller size.''
Color: Dark brownish-green.
Distribution: Union of South Africa.

C. hartwigi Müller 1900
Size: Length of female 0.80 mm. Males unknown.
Color: Slate gray.
Distribution: Germany; Morocco.

C. helvetica Kaufman 1892
Size: Length of female 0.62 mm; height 0.40 mm. Males unknown.
Color: Green with three darker bands, the middle one imperfectly developed.
Distribution: Switzerland.

C. hirsuta Sars 1924a
Size: Length of female 0.80 mm. Males unknown.
Color: Not recorded.
Distribution: South Africa.

C. inaudita Furtos 1936a
Size: Length of female 0.72 mm; height 0.40 mm. Males unknown.
Color: The color had been destroyed by a preservative.
Distribution: Yucatan.

C. lusatica Schäfer 1943
Size: Length of female 0.64 mm; height 0.33 mm. Male unknown.
Color: Yellowish-brown.
Distribution: Morocco.

C. mexicana Furtos 1938
Size: Length of female 0.35-0.38 mm; height 0.25-0.26 mm. Males unknown.
Color: "Undetermined due to action of preservatives on pigments."
Distribution: Yucatan.

C. musquizensis Tressler 1954
Size: Length of female 0.70 mm; height 0.44 mm. Length of male 0.62 mm; height 0.41 mm.
Color: Not recorded.
Distribution: Texas.

C. niagraensis Furtos 1936a
Size: Length of female 0.58 mm; height 0.35 mm. Males unknown.
Color: "Three dorso-lateral bands of dark hue."
Distribution: Yucatan.

C. obscura Sars 1901
Size: Length of female 0.70 mm. Males unknown.
Color: Dark green with darker shadows, but without well formed bands.
Distribution: Argentina. Cultured in an aquarium from dried mud.

C. ochracea Sars 1924a
Size: Length of female 0.78 mm. Males unknown.
Color: Pale yellow.
Distribution: South Africa.

C. okeechobei Furtos 1936b
Size: Length of female 0.64 mm; height 0.40 mm. Length of male 0.58 mm; height 0.37 mm.
Color: Light yellow with three dark-green dorso-lateral bands.
Distribution: Florida.

C. phantomensis Tressler 1954
Size: Length of male 0.64 mm; height 0.44 mm. Females not observed.
Color: Not recorded.
Distribution: Texas.

C. pincta (Strauss 1821)
Size: Length of female 0.60 mm. Males unknown.
Color: Green with three lateral gray bands.
Distribution: France.

C. pinguis Sars 1901
Size: Length of female 0.80 mm. Males unknown.
Color: Not recorded.
Distribution: Argentina. Cultured in an aquarium from dried mud.

C. potamis Tressler 1954
Size: Length of female 0.60 mm; height 0.40 mm. Males unknown.
Color: Not recorded.
Distribution: Texas.

C. punctata Sars 1924b
Size: Length of female 0.70 mm. Males unknown.
Color: Not recorded.
Distribution: Southwest Africa.

C. pygmaea Sars 1924a
Size: Length of female 0.45 mm. Males unknown.
Color: Not recorded.
Distribution: South Africa. Cultured in an aquarium from dried mud.

C. pyramidata Sars 1924a
Size: Length of female 0.59 mm. Males unknown.
Color: Not recorded.
Distribution: South Africa.

C. reniformis Sars 1924a
Size: Length of female 0.80 mm. Males unknown.
Color: Not recorded.
Distribution: South Africa.

C. rhomboidea Furtos 1936a
Size: Length of female 0.68 mm; height 0.40 mm. Males unknown.
Color: Not recorded.
Distribution: Yucatan.

C. spinifera Sars 1924a
Size: Length of female 0.80 mm. Males present, but in smaller numbers than females.
Color: Dark green.
Distribution: Union of South Africa.

C. striolata Sars 1924a
Size: Length of female 0.54 mm. Males unknown.
Color: Dark Green.
Distribution: Cultured in an aquarium from dried mud. South Africa.

C. tonsa Sars 1924a
Size: Length of female 0.78 mm. Males unknown.
Color: Not recorded.
Distribution: South Africa.

C. toyensis Tressler 1954
Size: Length of female 0.61 mm; height 0.34 mm. Males unknown.
Color: Reddish-brown.
Distribution: Texas.

C. trigonella Sars 1924a
Size: Length of female 0.63 mm. Males unknown.
Color: Light green with a distinct orange tinge on posterior portion of shell; the orange color is due to ripe ova.
Distribution: South Africa. Cultured in an aquarium from dried mud.

C. tumidula Sars 1924a
Size: Length of female 0.58 mm; length of male 0.50 mm.

Color: Not recorded.

Distribution: South Africa. Cultured in an aquarium from dried mud.

C. vidua (O. F. Müller 1776) Brady 1867

Size: Length of female 0.64-0.72 mm; height 0.40-0.45 mm. Males unknown.

Color: Ground color green or white with dark green or black transverse bands.

Distribution: Common throughout the Holarctic region, and also reported from the Neotropical.

C. viduella Sars 1896

Size: Length of female 0.60 mm; height 0.30 mm. Males unknown.

Color: Not recorded.

Distribution: Africa; Yucatan.

C. yucatanensis Furtos 1936a

Size: Length of female 0.35 mm; height 0.25 mm. ''Males slightly smaller than females.''

Color: Destroyed by preservative.

Distribution: Yucatan.

Cypridopsis canadensis, n. sp.

Figs. 1-4.

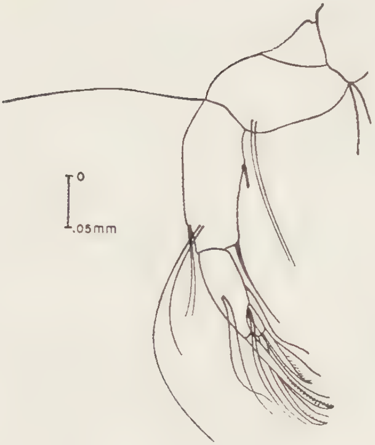
Specific characters.—*Female.* Shell ovoid, tumid; height approximately three-fifths of the length; greatest height at or near the middle. Dorsal margin of the left valve evenly arched, ventral margin almost straight; anterior and posterior extremities broadly rounded. Dorsal margin of the right valve with sinuations anterior and posterior to the middle; extremities rounded; antero-ventral margin serrated; ventral margin slightly sinuated. Surfaces of valves with short hairs and puncta; submarginal line considerably removed from anterior extremity. Color gray, without transverse bands. Length 0.76 mm., height 0.46-0.47 mm. Natatory setae of second antennae barely reaching the tips of the end-claws. The proximal podomere of the mandibular palp with a distinctive seta-bearing club.

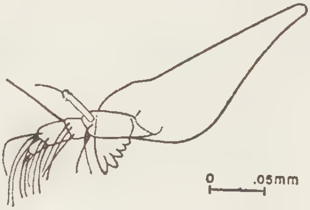
Male.—Unknown.

Remarks.--The size, color, and shape of the valves, and the peculiar seta-bearing club of the mandibular palp constitute a group of characters that serve to distinguish *Cypridopsis canadensis* n. sp. from all other members of the genus.

Type locality.—*C. canadensis* n. sp. was collected by Dr. Richard W. Coleman on August 14, 1957 from a pool near Coop Petroleum Products, Southey, Saskatchewan, Canada.

Type specimens. A stained microscopic mount of the holotype female and one paratype female preserved in ethyl alcohol are deposited in the United States National Museum. Catalogue numbers are for the holotype USNM 102576 and for the paratype USNM 102577.





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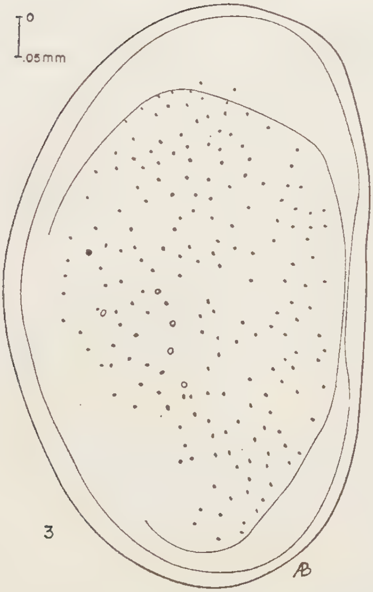

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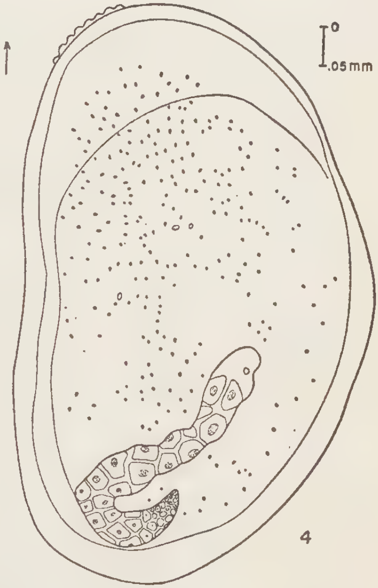

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PLATE

Cypridopsis canadensis n. sp.—Drawings were made from a specimen stained with a 1% alcoholic solution of eosin Y and mounted in Canada balsam.

Fig. 1. Antepenultimate, penultimate, and ultimate podomeres of second antenna.

Fig. 2. Mandible with mandibular palp.

Fig. 3. Mesial view of left valve.

Fig. 4. Mesial view of right valve with ovary.

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TWO NEW TROGLODYTIC MILLIPEDS FROM TEXAS

By Nell B. Causey

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Six, or possibly five, species of millipeds have been collected in Texas caves. Additional forms will certainly be discovered, for relatively little collecting has been done. These troglodytic millipeds are either cambalids or polydesmids and are not known to have close relatives in the nearby epigean habitats, where the dominant orders are Julida and Spriostreptida.

The following summary includes the millipeds and the caves from which they have been collected: *Eclomus specobius* Chamberlin 1952 and *Cambala caeca* Loomis 1953, which possibly are synonyms (Loomis, 1953), from both Wyatt Cave and Felton Cave, Sutton County; *Cambala* sp. from Mayfield Cave, Sutton County; *Cambala captiosa,* n. sp., from Beck's Ranch Cave, Williamson County; a small, eyeless cambaloid form, possibly epigean, of uncertain genus, from Big Mouth Cave, Wheeler County; *Speodesmus echinourus* Loomis 1939, from Prassel Ranch Cave, Kerr County, Ezell's Cave, Hays County, a tentative determination (Chamberlin, 1952) from Wonder Cave, Hays County, Schneider Cave and Cascade Cave, Kendall County; and *Speodesmus bicornourus,* n. sp., from Beck's Ranch Cave, Williamson County.

Cambala captiosa, new species

Figures 1-3

Diagnosis: An eyeless species closely resembling *C. caeca*, from which it can be distinguished by the absence of a caudally produced margin on the posterior angle of the collum and by the presence of hooked setae on the apex of the coxa of the posterior gonopod.

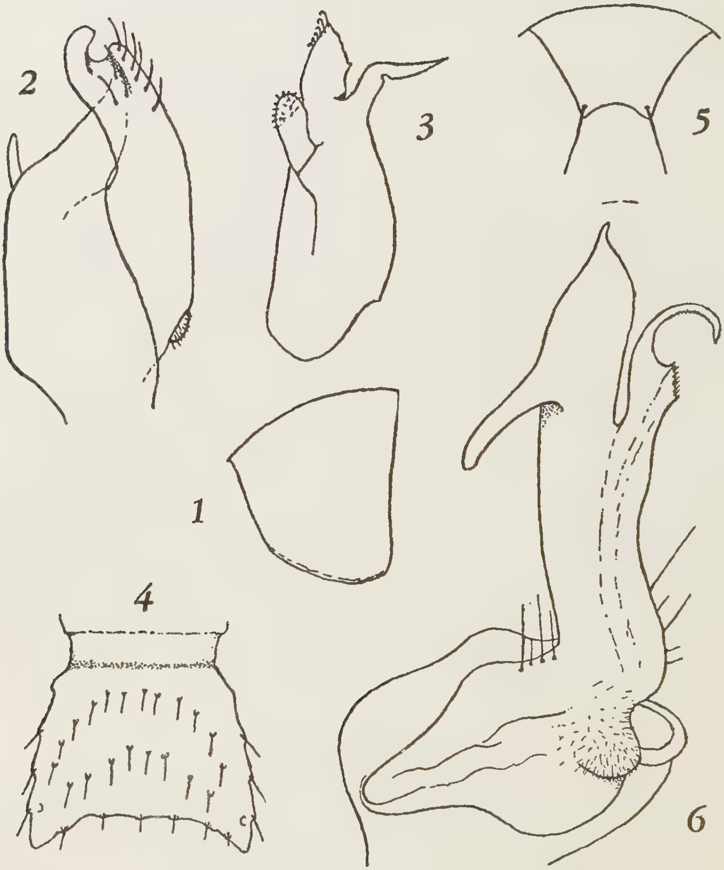
Type material: Male holotype, American Museum of Natural History; female and larval male paratypes in the author's collection.

Type locality: Beck's Ranch Cave, Beck's Ranch, 6 miles west of Round Rock, Williamson County, Texas, 1 ♂, 1 ♀, 1 larval ♂, Dec. 10, 1955, W. McAlister and D. Kyser.

Range: Known only from the type locality.

Description of male holotype: Length about 19 mm., width 1.5 mm., 41 segments, the last three legless. Dark brown in alcohol.

Head smooth, without ocelli, the clypeus with 4 widely spaced setae



EXPLANATION OF FIGURES

Cambala captiosa, n. sp., male holotype. Fig. 1. Collum, left lateral view. Fig. 2. Right anterior gonopod, ventral view. Fig. 3. Left posterior gonopod, lateral view.

Speodesmus bicornourus, n. sp., male holotype. Fig. 4. Sixteenth body segment, dorsal view. Fig. 5. Anal scale. Fig. 6. Right gonopod, posterior view.

and the labrum with about 14. Antennae thickened, the second segment almost twice as long as broad and segments 5 and 7 broader than long; segments in order of decreasing length 2, 3, 4, 5, 6, 1, 7. Collum as long as the next three segments combined; from a lateral view (fig. 1) the posterior margin appears almost straight; the lateral margin is slightly raised from the level of the dorsal ridge of the antennal furrow to the posterior angle; a few very indistinct horizontal triae can be seen on the posterior margin above the posterior angle. Segment 7 is approximately one-half broader than the second through the sixth segments. Tergites of the first three and the last segment are entirely smooth above; each of the remaining segments has six conspicuous dorsal crests and about 12 much less distinct crests and striae on the lateral and ventral surfaces; dorsal crests of segment 4 not as well developed as those of the following segments; segment 2 with a small lateral crest at about the level of the posterior angle of the collum; segments 2 and 3 with a few faintly indicated striae on the lateral and ventral surfaces. Pore crests begin on segment 5 and continue through penultimate segment and are typically the same height and length as the four plain dorsal crests; anterior half of pore crests about four times as broad as posterior half and slightly higher. Anal tergite as long as the two preceding segments, its apex not extending beyond the anal valves; anal valves smooth, inflated; preanal scale broad.

First legs composed of 5 segments, the basal one with an acute lateral lobe, the distal one with a terminal claw. Segments 3 and 4 of legpairs 6 and 7 inflated and rounded on the ventral surface.

Apex of anterior gonopod (fig. 2) longer and more sharply curved than in *C. caeca.* Apex of coxa of posterior gonopod (fig. 3) with several hooked setae and the short telopodite with numerous short prickles on the apical half, distinguishing this species from *C. caeca.*

Female paratype: Length about 23 mm., width 1.9 mm., 50 segments, the last one legless. Arrangement of crests and other somatic characters as in the male.

Cambala sp.

Record: Mayfield Cave, Sonora, Sutton County, Texas, 1 mutilated specimen of undetermined sex, Feb. 9, 1957, Ross Gurner. Width 1.5 mm., 2 legless segments, collum as in *C. caeca,* which has been collected in nearby caves.

Speodesmus bicornourus, new species

Figures 4-6

Diagnosis: Distinguished from *S. echinourus* by its larger body, longer legs, shorter setae on the dorsum, and the presence of only two setae on the preanal scale.

Type material: Male holotype and female paratype, American Museum of Natural History; remaining male and female paratypes in the author's collection.

Type locality: Beck's Ranch Cave, Beck's Ranch, 6 miles west of

Round Rock, Williamson County, Texas, 3 ♂, 4 ♀, Dec. 10, 1955, W. McAlister and D. Kyser.

Range: Known only from the type locality.

Description of male holotype: Length about 19 mm., width 1.2 mm., length of antennae about 3 mm. Color in alcohol pale yellow-gray. Body loose-jointed.

Collum almost as broad as head, its anterio-lateral margin semicircular and its posterior margin very slightly concave; lateral margin slightly irregular and without well defined teeth; anterio-lateral margin with 14 setiferous tubercles; one-third of the way back from the anterior margin there is an irregular row of 8 setiferous tubercles, and two-thirds of the way back is another irregular row of 8. Surface between tubercles smooth on all segments. Metatergite of second segment rectangular, as broad as any of the other tergites, its lateral margin with about 7 irregular teeth. Metatergites of segments 3 and 4 slightly longer and broader than collum, their anterior angles, as on all of the following metatergites, are rounded and the lateral margins have 3 setose teeth and one or two indistinct teeth without setae. On succeeding segments the anterior angles of the metatergites are more broadly rounded, the posterior angles are more acutely produced behind the posterior margin, and the lateral teeth are minute. Ratio of length to width of metatergite of segment 8 about 3/4; on more posterion segments it is about 8/9 ,fig. 4). Metatergites 2 through 19 each with 3 transverse rows of setose tubercles, with from 8 to 12 in the first and second rows and 6 in the row on the caudal margin; on segments 2 through 5 all three rows are almost straight; from segment 6 on back the first row is strongly bowed and the second row is moderately bowed. Pore formula normal. Pores open on the dorsal surface of the metatergites near the third setigerous tooth.

Typical legs are about 3 mm. long, slender, with the ratio of the length of the segments, beginning with the first, as follows: 3, 10, 24, 8, 9, 27. The first and second legspairs are one-half and two-thirds the length of typical legs, respectively. Other legs anterior to the gonopods are slightly shortened. No tubercles were observed on the legs.

In situ, the solenomerite of the gonopod is contiguous with its mate in the middle line. The retrorse lateral spine seems to be nearer the apex of the telopodite than in *E. echinourus*, which I have not seen; the solenomerite is a relatively short branch and the opening of the seminal canal is minutely fringed (fig. 6).

Specodesmus echinourus

Record: Ezell's Cave, San Marcos, Hays County, Texas, 1 ♀, 1 larval ♂, Mar. 25, 1937, Ottys Sanders. In this species the body is much smaller, the legs are shorter, the dorsal setae longer and more numerous, and the lateral teeth distinctly sharper than in *S. bicornourus*.

I am indebted to Dr. T. C. Barr, Jr., and to Mr. Ottys Sanders for the specimens used in the preparation of this paper.

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PROCEEDINGS
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A SECOND SPECIES OF THE MILLIPED GENUS *TRIGENOTYLA* (CHORDEUMIDEA: CONOTYLIDAE: TRICHOPETALINAE: SCOTERPINI)

By Nell B. Causey

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The segmentation of the basal region of the posterior gonopod offers a convenient basis for dividing the family Conotylidae into natural groups. The trend in the evolution of this gonopod from a 7-segmented walking leg is toward a structure composed of only two thickened, elongated segments. This has been brought about by the fusion of the three basal segments and by the degeneration of the three distal segments or by fusion of part of them with the fourth segment, the femur.

The North American subfamilies of the Conotylidae are the Conotylinae, in which the basal segment of the posterior gonopod is a short coxa with a gland opening and conspicuous processes; and the Trichopetaline, in which the basal segment is an elongated coxoprefemur. In the tribe Trichopetalini a small, rounded coxal lobe and the opening of the coxal gland are on the mesial surface of the coxoprefemur. In the tribe Scoterpini two membranous pieces extend from the base of the coxoprefemur across the sternum to the opposite coxoprefemur; the anterior extension is a continuous band and the posterior one is a coxal lobe that is contiguous with its mate in the midline; the opening of the coxal gland is at the apex of the coxal lobe. The two genera included in the Scoterpini, *Scoterpes* and *Trigenotyla,* resemble the Trichopetalini in the long segmental setae, the small body, the absence or almost complete absence of body pigment, and in the structure of the anterior gonopods.

The resttelopodite (This name was used by Verhoeff for the region of the gonopod beyond the coxoprefemur.) consits of one elongated segment in the epigean genus *Trigenotyla,* while in the troglodytic genus *Scoterpes* it consists of one elongated segment, which is the femur, and two or three degenerate terminal segments. The presence of segments beyond the femur is a primitive character that is found in the family Conotylidae only in the genus *Scoterpes.* Natural selection within caves has favored the retention of the terminal segments, while they were lost in epigean forms. In the tribe Trichopetalini, the resttelopodite consists of only one segment in all known members, including the troglodytic genus *Zygonopus.* This suggests that *Zygonopus* became a troglodyte after the reduction of the posterior gonopod to two segments had occurred.

Genus *Trigenotyla*

Trigenotyla Causey, 1951, Proc. Biol. Soc. Washington, vol 64, p. 118.

Generotype: *T. parca* Causey 1951. Other species: *T. vaga,* n. sp. *Craspedosoma flavidum* Bollman 1888 may be congeneric with these species.

Range: *Trigenotyla parca* has been collected in Carroll, Washington, and Madison Counties, Arkansas, and *T. vaga* in Latimer County, Oklahoma.

Body 6 to 7 mm. long, weakly pigmented; no promentum; ocelli in about three irregular rows that form a triangular patch; antennae clavate, about as long as the width of the body; paranota small, the anterior angle rounded; length of segmental satae about four-tenths the body width, set in a very slightly curved oblique row on most segments, the distance between the two internal setae of a segment usually more than three times the distance between the external and internal setae; segmental setae shorter, finer, and more widely separated across the dorsum than in *Scoterpes*; sixth leg-pair with segments 3 and 4 slightly thickened and bowed. Anterior gonopod with a medial group of three setae and a lateral group of several setae; the elongated coxite is deeply bifid; the pseudoflagellum is either plumose or membranous. The posterior gonopod is composed of two segments; the basal segment is prolonged ventrad beyond its articulation with the smaller second segment; the coxal lobe extends mesiad from the base of the coxoprefemur to the middle of the sternum, and a continuous membranous band connects the two prefemurs.

Key to the Species of *Trigenotyla,* Based on the Male

Both branches of the coxite of the anterior gonopod are narrow; one margin of the anterior branch is irregularly toothed. Pseudoflagellum plumose .... *parca*

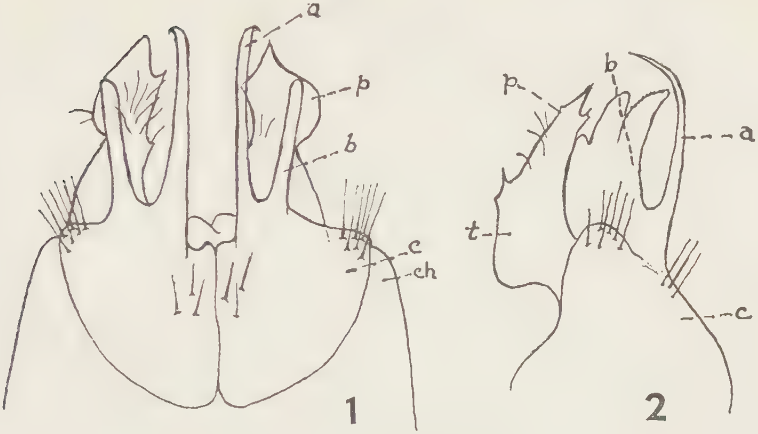
Anterior branch of the coxite of the anterior gonopod is narrowly elongated and both margins are even; the posterior branch is broadly lamellar and divided into three short lobes at the apex. Pseudoflagellum broad and membranous .... *vaga,* n. sp.

Trigenotyla vaga, new species

Figures 1 and 2

Diagnosis: Distinguished from *T. parca* by the anterior gonopod, which has the anterior branch of the coxite narrowly attenuated and the posterior branch broadly lamellar.

Type locality: A river ravine, Latimer County, Oklahama, 1 ♂, Dec. 9, 1933, collected by J. R. Carpenter.



Explanation of Figures

Trigenotyla vaga, new species, male holotype. Figure 1. Anterior gonopods, anterior view. Figure 2. Left anterior gonopod, lateral view. a-anterior branch of coxite; b-posterior branch of coxite; c-coxa; ch-cheirite; p-pseudoflagellum; t-telopodite.

Type material: Male holotype in American Museum of Natural History.

Range: Known only from the type locality.

Description of male holotype: Length about 6.5 mm., greatest width 1 mm. Color amber, possibly modified by having been dry. Ocelli in a triangular area on a brown background, in irregular rows of 7, 5 (4), 2. Paranota and arrangement of setae as in *T. parca.* Tarsi of legpairs 3, 4, and 5 with a row of setae with minute bladders at the apex. Sixth legpair with segments 3 and 4 slightly thickened and bowed. No lobes observed on seventh legpair. Coxae of legpairs 10 and 11 with the usual coxal gland openings.

Anterior gonopod (Figures 1 and 2) with the coxite deeply bifid, the anterior branch elongated, evenly attenuated, and bent caudad; and the posterior branch large, lamellar, with three stout teeth at the apex. Coxal setae straight, a group of three near the median line and another group of six near the ventral margin. Telopodite much narrower and shorter than the coxa; its pseudoflagellum is as large as the posterior branch of the coxite and in the form of an irregular membrane on which a few fibrillae can be seen. Cheirite narrowed, its apex not reaching to the ventral margin of the coxa.

Posterior gonopod as in *T. parca.*

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SNAKES OF THE CHILPANCINGO REGION, MEXICO

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In the course of biological investigations carried on by the senior author and his students in the Mexican state of Guerrero from 1952 to 1958, 283 snakes were assembled from the Chilpancingo region. These represent 42 species, five of which have not been reported previously from that area. Although we concentrated heavily on the herpetofauna, we failed to take 19 species that had been reported by other workers in the area.

Our efforts were concentrated in the vicinity of Acahuizotla, a small village about 30 km. south of Chilpancingo, but we made numerous trips to localities within a radius of 50 miles.

Physiography and Vegetation. The main topographic features of central Guerrero have been produced by erosion and volcanism. The most conspicuous feature of the area is the Sierra Madre del Sur which trends in a general east-west direction in conformity with the shape of the continental mass. The Balsas Basin, which borders the study area on the north, was formed by the Río Balsas, the major river of Guerrero. Within the basin proper the seasons are rather distinct. The rainy season is extremely short, lasting mainly from June through September, but sporadic rains occur in October and November. The rains fall primarily in late afternoon and at night. They are usually of short duration but often torrential. Daytime temperatures are hot throughout most of the year. The vegetation is xeric and sparse in most areas but becomes more luxuriant at higher elevations.

The mountains of the Sierra Madre del Sur form an effective barrier to prevailing winds from the Pacific and their north side is comparatively drier than the south. Consequently, the Tropical Deciduous Forest is composed of two types; the xeric, which lies on the northern slopes of the sierra, and the mesic, which occupies the southern slopes. The elevations at which the various vegetation types occur are about 2000 feet lower on the southern slopes and the ecotone between the tropical deciduous and pine-oak forests is not as distinct as that on the northern slopes.

Of the 61 forms of snakes occurring in the region, more than half (34) are confined to one of four vegetation types (Fig. 1); 27 occur in two or more types (Fig. 2).

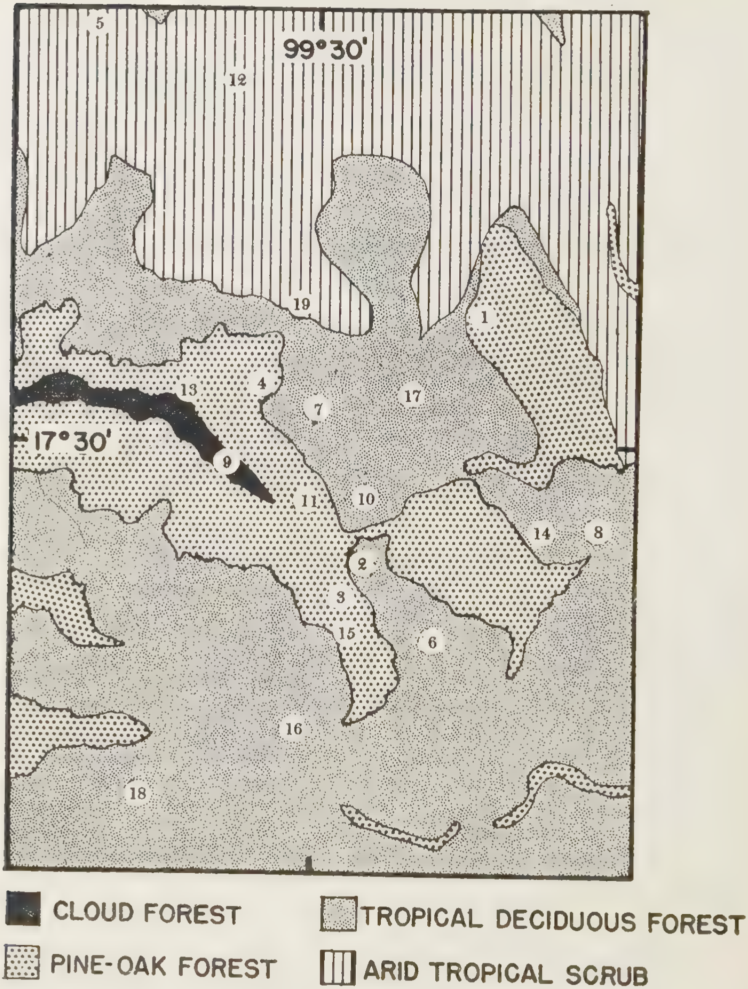

FIGURE I.

Figure 1. Vegetational map of the Chilpancingo Region. The numbers are sites at or near wich specimens have been taken. (1) Almolonga (= Amula), (2) Acahuizotla, (3) Agua del Obispo, (4) Amojileca, (5) Balsas Norte, (6) Chapolapa, (7) Chilpancingo, (8) Colotlipa, (9) Cuapongo, (10) Mazatlán, (11) Mazatlán Logging Camp, (12) Mexcala, (13) Omilteme, (14) Quechultenango, (14) Rincón, (16) Tierra Colorada, (17) Tixtla, (18) Xaltianguis, (19) Zumpango.

The following accounts of species are based on specimens collected by field parties of the Department of Wildlife Management and deposited in the Texas Cooperative Wildlife Collection (TCWC).

Family TYPHLOPIDAE Jan

Typhlops braminus (Daudin)

TCWC (5), Tropical Deciduous Forest. Acahuizotla, 2800 ft., (4); 1 mi. SW Colotlipa, 2800 ft., (1). Scales from rostral to tip of tail, 303-322, mean 313; scale rows at mid-body, 20; supralabials, 4—4 (4), 3—3 (1); each scale with minute brown stippling. Other records: Chilpancingo (Shreve, 1938; Taylor, 1940a); Agua del Obispo (Smith, 1943; Taylor, 1940a); *ca.* Xaltianguis (Taylor, 1940a).

Leptotyphlops phenops bakewelli (Oliver)

TCWC (5), Tropical Deciduous Forest. Acahuizotla, 2800 ft., (2); 2 mi. W. Colotlipa, 2700 ft., (1); 1 mi. SW Colotlipa, 2800 ft., (2). Scale rows at mid-body, 14; ventrals, 221-246, mean 236; caudals, 11-20, mean 14.8; supralabials, 4—4; infralabials, 4—5 (1), 5—5 (2), 6—6 (2). Other record: Acahuizotla (Smith, 1943).

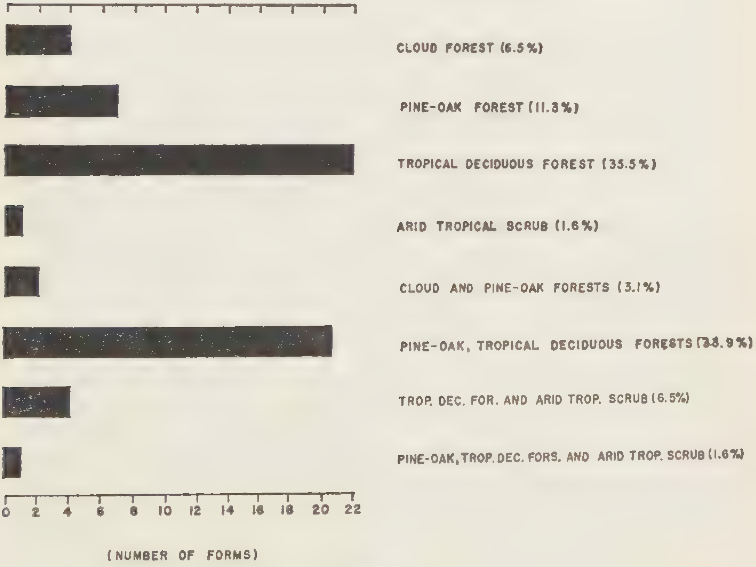

FIGURE 2

Figure 2. Bar graph showing the distribution of snakes in the Chilpancingo region according to vegetation types. Note that the bottom four bars include two or more vegetation types; the top four, a single vegetation type.

Family BOIDAE Gray

Constrictor constrictor imperator (Daudin)

TCWC (13), Lower Pine-oak and Tropical Deciduous forests. Acahuizotla, 2800 ft., (5); *ca.* Colotlipa, 2800 ft., (2); 5 mi. SE Tierra Colorada, 1000 ft., (1); Xaltianguis, 1600 ft., (1); *ca.* Agua del Obispo, 3300 ft., (5). Scale rows at mid-body, 61—76, base of tail, 37—42; ventrals of males, 237—239, mean 238, of females, 229—249, mean 238.4; caudals of males, 64—67, mean 65.7, of females, 52—62, mean 56.3; supralabials, 18—21; infralabials, 21—25; total length of largest specimen, 2030 mm., smallest, 482 mm. This species exhibited the greatest amount of variation of all of the forms examined.

Family PYTHONIDAE Cope

Loxocemus sumichrasti (Bocourt)

TCWC (1 female), Tropical Deciduous Forest. Acahuizolta, 2800 ft. Scale formula, 30—31—25; ventrals, 263; caudals, 43; supralabials, 10—11; infralabials, 12—12; preoculars, 1—1; postoculars, 3—3; temporals, 3+4 on each side. Our specimen is similar to those taken near Acapulco by Taylor (1940b).

Family COLUBRIDAE Dunn

Clelia clelia clelia (Daudin)

TCWC (2), Tropical Deciduous Forest. Acahuizotla, 2800 ft. The two specimens, both females, definitely establish the presence of this race in the Pacific subregion of southwestern Mexico. According to Smith and Taylor (1945), this race previously was known from only five localities in Chiapas, Oaxaca, Tabasco, Veracruz, and Yucatán.

Our specimens show no approach to the color ascribed to the northern race *immaculata* in Colima and Jalisco. Each of the dorsal scales is distinctly dark-tipped. Scale formula, 17—17—17; ventrals, 221, 228; caudals, 75, 84; supralabials, 7—7; infralabials, 8—8, preoculars, 1—1; postoculars, 2—2; temporals, 2+3 on each side; loreal distinct, longer than high; total length, 686, 495 mm.

Coniophanes fissidens dispersus (Smith)

TCWC (1 male), Tropical Deciduous Forest. Acahuizotla, 2800 ft. Scale formula, 19—19—15; ventrals, 123; caudals, 75; supralabials, 8—8; infralabials, 9—9; preoculars, 1—1; postoculars, 2—2; temporals, 1+2+3 on each side. Our specimen differs from the description of the type and paratype mainly in the paucity of white in the region of the nape, dark stripes strongly evident only on the tail; two white spots on each side of the neck, rather than one.

Conophis vittatus viduus (Cope)

TCWC (9), Lower Pine-oak and Tropical Deciduous forests. Acahuizotla, 2800 ft. (3); Agua del Obispo, 3300 ft. (1); *ca.* Colotlipa, 2700 ft. (5). Differences between specimens from the Chilpancingo region and a series of *C. vittatus vittatus* from the vicinity of Acapulco are as follows:

Chilpancingo Area	Acapulco
Ventrals	
(7) Male 161—164 (M—162.0)	(7) 149—156 (M—152.4)
(2) Female 163, 168	(2) 157, 159
Caudals	
(7) Male 64—71 (M—66.3)	(7) 65—67 (M—66.0)
(2) Female 63, 65	(2) 60, 62

Previous to this study, *C. vittatus viduus* was known only from the vicinity of Tehuantepec, Oaxaca. The aforementioned series extends the range of *vittatus viduus* some 300 airline miles west northwest.

Dryadophis melanolomus stuarti (Smith)

TCWC (3), Lower Pine-oak and Tropical Deciduous forests. Acahuizotla, 2800 ft. (2); Agua del Obispo, 3300 ft. (1). Scale formula, 17—17—15; ventrals of male, 182, of females, 187, 188; caudals of male, 120, of females, 113, 114; supralabials, 9—9; infralabials, 10—11 (2), 11—11 (1); preoculars, 1—1 (2), 2—2 (1); postoculars, 2—2; temporals, 2+2 on each side.

Drymarchon corais rubidus (Smith)

TCWC (4 males), Tropical Deciduous Forest. 2 mi. SW Colotlipa, 2700 ft. (1); Acahuizotla, 2800 ft. (2); Tixtla, 4300 ft. (1). Scale formula, 19—17—15; ventrals, 199—201 (M—199.8); caudals, 72—77 (M—75.0); supralabials, 8—8; infralabials, 8—8 (1), 8—9 (2), 9—9 (2); preoculars, 1—1; postoculars, 2—2; temporals, 2+2. Other record: *ca.* Chilpancingo (Hall, 1951).

Drymobius margaritiferus fistulosus (Smith)

TCWC (17), Tropical Deciduous Forest. Acahuizotla, 2800 ft. (13); *ca.* Colotlipa, 2700 ft. (2); *ca.* Tierra Colorada, 1000 ft. (2). Scale formula, 17—17—15; ventrals of males, 143—150 (M—147.0), of females, 147—153 (M—149.6); caudals of males, 130—138 (M—134.6), of females, 126—131 (M—128.0); supralabials, 9—9 (15), 9—10 (2); infralabials, 9—10 (1); 10—10 (12), 10—11 (2), 11—11 (2); preoculars, 1—1; postoculars, 2—2; temporals, 2+2 on each side. Other records: Tierra Colorada, Ocotito (Smith, 1942b).

Elaphe triaspis intermedia (Boettger)

TCWC (13), Lower Pine-oak and Tropical Deciduous forests. Acahuizotla, 2800 ft. (10); Agua del Obispo, 3300 ft. (1); 1 mi. SW Tixtla, 4500 ft. (1); 4 mi. N. El Ocotito, 2400 ft. (1). Scale formula, 27—31—21 to 33—35—25, more commonly 29—35—21; ventrals of males, 242—260 (M—252.3), of females, 267—282 (M—275.7); caudals of males, 108—124 (M—118.8), of females, 85—107 (M—94.5); supralabials, 8—8 (6), 8—9 (6), 9—9 (1); infralabials, 10—11 (5), 11—11 (5); 11—12 (2), 12—12 (1); preoculars, 0—0 (1), 1—1 (11), 1—2 (1); postoculars, 2—2; temporals, 2+5 to 3+5, more commonly 3+4. Other records: *ca.* Chilpancingo (Hall, 1951); Amula (Günther, 1894).

Enulius unicolor (Fischer)

TCWC (2 males), Lower Pine-oak and Tropical Deciduous forests. 4 mi. W. Chilpancingo, 5800 ft. (1); Acahuizotla, 2800 ft. (1). Scale formula, 17—17—17; ventrals, 166, 175, caudals, 87, 104; supralabials, 7—7; infralabials, 7—7, 7—8; no preoculars; postoculars, 2—2; temporals, 1+2 on each side. The male from 4 mi. W. Chilpancingo differs from the series discussed by Taylor (1940b), in having a lower combination of ventrals and caudals, 270, rather than 280 or more. Other record: Agua del Obispo (Taylor, 1940b).

Geophis omiltemana (Günther)

TCWC (2), Humid Pine-oak Forest. 1 mi. W. Omilteme, 7800 ft. Scale formula, 17—17—17; ventrals of male, 158, of females, 160; caudals of male, 48, of female, 42; supralabials, 6—6; infralabials, 7—7; no preoculars; postoculars, 2—2; temporals, 1+2 on each side. The vertebral and two paravertebral scale rows of the male are faintly keeled. Other records: Omilteme (Günther, 1893; Smith, 1943).

Lampropeltis doliata blanchardi (Stuart)

TCWC (5), Lower Pine-oak and Tropical Deciduous forests. *ca.* Colotlipa, 2700 ft. (2); 10 km. SW Chilpancingo, 4500 ft. (1); 2.5 mi. S. Almolonga, 5600 ft. (2). Scale formula, 23—21—19; ventrals of males, 211, 212 (2), of females, 208, 211; caudals of males, 54 (2), 55, of females, 51, 48; supralabials, 7—7; infralabials, 9—9; preoculars, 1—1; postoculars, 2—2; temporals, 2+3 on each side. This series differs from a series examined by Hall (1951) in having all infralabials 9—9, rather than 8+8. Other records: *ca.* Chilpancingo (Gadow, 1905; Hall, 1951); Tierra Colorada, Amula (Smith and Taylor, 1945).

Leptodeira septentrionalis polysticta (Günther)

TCWC (4), Lower Pine-oak and Tropical Deciduous forests. Acahuizotla, 2800 ft. (3); Agua del Obispo, 3300 ft. (1). These specimens are discussed in detail by Duellman (1958). Other record: Agua del Obispo (Smith, 1943).

Leptodeira latifasciata (Günther)

TCWC (2), Tropical Deciduous Forest. Acahuizotla, 2800 ft. In our two immature specimens, the male has eight white rings on the body and four on the tail; in the female, seven and three, respectively. The nape and posterior part of the head back of the eyes are orange in color; the black bands are about three times as wide as the white ones. Other records: Rio Balsas (Boulenger, 1905; Gadow, 1905); El Naranjo (Taylor, 1938).

Leptodeira annulata cussiliris (Duellman)

TCWC (14), Lower Pine-oak and Tropical Deciduous forests. Acahuizotla, 2800 ft. (9); 4 mi. W. Chilpancingo, 5800 ft. (1); 5 mi. SW Tierra Colorada, 1000 ft. (1); Rincón, 2500 ft. (2); 4 mi. N. Ocotito, 2600 ft. (1). This series is discussed in detail by Duellman (1958). Other records: *ca.* Chilpancingo, Tierra Colorada, Agua del Obispo (Smith, 1943; Duellman, 1958); Mazatlán (Taylor, 1938); Omilteme, Xaltianguis (Duellman, 1958).

Manolepis putnami (Jan)

TCWC (8), Tropical Deciduous Forest. Acahuizotla, 2800 ft. Scale formula, 19—19—15; ventrals of males, 170, 173, of females, 179—182 (M—180.7); caudals of males, 74, 80, of females, 65—68 (M—66.6); supralabials, 8—8; infralabials, 10—10; preoculars, 1—1; postoculars, 2—2; temporals, 1+2+3 on each side. This series differs from those reported on from Tehuantepec, Oaxaca, by Werler and Smith (1952) in having 10 infralabials, rather than 9; ventral coloration of males identical to that of females rather than immaculate; dorsal color of females brownish rather than gray; brown line on first scale row distinct rather than broken and ill defined; chin, throat, and venter to 17th ventral black, rather than chin only black. There is much less sexual dichromatism in our series than that of the Tehuantepec population.

Masticophis flagellum lineatus (Bocourt)

TCWC (17), Lower Pine-oak and Tropical Deciduous forests. *ca.* Chilpancingo, 4500 ft. (2); Acahuizotla, 2800 ft. (5); 3 mi. S. Petaquillas, 4800 ft. (1); 1 mi. SW Colotlipa, 2700 ft. (3); *ca.* Mazatlán, 4400 ft. (1); Palo Blanco, 3000 ft. (1); 2.5 mi. S. Almolonga, 5600 ft. (4). Scale formula, 19—17—13; ventrals of males, 182-193 (M—187.0), of females, 189-197 (M—193.6); caudals of males, 116-133 (M—124.0), of females, 115-125 (M—119.7); supralabials, 8—8 (15), 8—9 (2); infralabials, 9—10 (1), 10—10 (14), 10—11 (1), 11—11 (1); preoculars, 2—2; postoculars, 2—2 (16), 2—3 (1); temporals, 2+3+3 (16), 1+2+3 (1) on each side. Other records: *ca.* Chilpancingo (Hall, 1951); Amula (Boulanger, 1893).

Oxybelis aeneus auratus (Bell)

TCWC (9), Tropical Deciduous Forest. Acahuizotla, 2800 ft. Scale formula, 17—17—13; ventrals of males, 190, 192, of females, 189—195 (M—192.3); caudals of males, 177, 188, of females, 171—190 (M—179.0); supralabials, 8—8 (8), 8—9 (1); infralabials, 8—9 (2), 9—9 (4), 9—10 (2), 10—10 (1); preoculars, 1—1; postoculars, 1—1 (1), 2—2 (8); temporals, 1+2 on each side. Our largest specimen measured 1368 mm., smallest, 1148 mm. Other records: *ca.* Chilpancingo (Hall, 1951); 6 km. N. Chilpancingo (Taylor, 1941).

Pituophis deppei lineaticollis (Cope)

TCWC (2 males), Tropical Deciduous Forest. Acahuizotla, 2800 ft. Scale formula, 27—27—21; ventrals, 238, 239; caudals, 69, 66+; supralabials, 8—8; infralabials, 11—12; preoculars, 1—1; postoculars, 2—2; temporals, 1+2+3 on each side. Other records: Omilteme (Stull, 1940); Chilpancingo (Smith and Taylor, 1945).

Rhadinaea aemula (Bailey)

TCWC (2), Dry Pine-oak Forest. 2.5 mi. S. Almolonga, 5600 ft. Scale formula, 17—17—17; ventrals of male, 158, of female, 169; caudals of male, 50+, of female, 106; supralabials 8—8, 8—9; infralabials, 10—10; preoculars, 1—1, 2—2; postoculars, 2—2, 2—3; temporals, 1+2+3 on each side. The female differs from the male in having a black dot on the outer edge of each ventral forming an inconspicuous line; the area below the black lateral line is stippled with black rather than clear white. Other records: Omilteme, Mountains near Chilpancingo, Amula (Bailey, 1940).

Rhadinaea hesperia hesperia (Bailey)

TCWC (3), Pine-oak Forest. Mountains west of Acahuizotla, 3500 ft. (1); Agua del Obispo, 3300 ft. (2). Scale formula, 17—17—17; ventrals of males, 149, 147, of female, 163; caudals of males, 120, 59+, of female, 97; supralabials, 8—8; infralabials, 9—9 (2), 9—10 (1); preoculars, 1—2 (1), 2—2 (2); postoculars, 2—2 (2), 3—3 (1); temporals, 1+2 on each side. The loreal scale is present in all three specimens. Other records: 5 mi. N. Chilpancingo (Smith, 1942c); Omilteme, Mountains near Chilpancingo, Chilpancingo, Amula (Bailey, 1940).

Salvadora intermedia intermedia (Hartweg)

TCWC (3), Pine-oak Forest. 4 mi. W. Chilpancingo, 6000 ft. (2); 2.5 mi. S. Almolonga, 5000 ft. (1). Scale formula, 17—15—13; ventrals of males, 177, 181, of female, 194; caudals of males, 102, 105, of female, 100; supralabials, 8—8; infralabials, 10+10; preoculars, 2—2; postoculars, 2—2 (2), 2—3 (1); temporals, 2+3 on each side. The female from Almolonga differs from all other known specimens of *intermedia* in having 194 ventrals rather than 182 or less. Other records: Chilpancingo (Hartweg, 1940); Amula (Boulenger, 1896).

Salvadora mexicana (Dumeril, Bibron, and Dumeril)

TCWC (14), Tropical Deciduous Forest and Arid Tropical Scrub. 1 mi. SW Colotlipa, 2700 ft. (2); *ca.* Tierra Colorada, 1000 ft. (7); Acahuizotla, 2800 ft. (3); Mexcala, 1700 ft. (2). Scale formula, 17—17—13; ventrals of males, 185—189 (M—187.0), of females, 188—193 (M—190.5); caudals of males, 124—142 (M—132.1), of females, 124—129 (M—126.0); supralabials, 8—9 (1), 9—9 (13); infralabials, 10—11 (1), 11—11 (12), 11—12 (1); preoculars, 1—1; postoculars, 2—2 (13), 2—3 (1); temporals, 2+1+2 (9), 2+2+2 (5) on each side. This species is common in the Chilpancingo region. This series was taken from rock walls, under rocks, in tall grass, and in trees. Two specimens were found on the highway, near Mexcala, stuck to freshly poured asphalt.

Sibon nebulatus (Linnaeus)

TCWC (1 male), Tropical Deciduous Forest. Acahuizotla, 2800 ft. Scale formula, 15—15—15; ventrals, 181; caudals, 91; supralabials, 7—7; infralabials, 10—10; preoculars, 0—0; postoculars, 2—3; temporals, 1+2 on each side. This specimen differs from the male discussed by Taylor (1940b), in having 10 infralabials rather than eight. Other record: Palo Gordo (Taylor, 1940b).

Stenorrhina freminvilli freminvilli (Dumeril, Bibron, and Dumeril)

TCWC (18); Tropical Deciduous Forest. 1 mi. SW Colotlipa, 2700 ft. (2); Acahuizotla, 2800 ft. (16). This series of specimens is composed of two distinct forms. One, which agrees with the description of *S. f. lactea* Cope, is reddish above and pinkish below, with a distinct dark stripe through the eye and usually a faint, brownish mid-dorsal stripe.

The other series, which agrees with the description of *S. f. freminvilli,* is grayish brown with five distinct blackish brown stripes. It is difficult for us to conceive of *lactea* as a subspecies of *S. freminvilli* because both forms occur together in relative abundance in central Guerrero without intergrading. A synopsis of the number of ventrals and caudals of the two forms is as follows:

freminvilli	Ventrals	''*lactea*''
165—169 (M—167.4)	males	164—171 (M—167.3)
170—176 (M—172.0)	females	170—175 (M—173.2)
	Caudals	
36—40 (M—38.2)	males	39—40 (M—39.7)
30—34 (M—32.8)	females	31—34 (M—32.7)

The two forms appear to be nothing more than color phases. We feel that *lactea* does not merit subspecific status and that it should be submerged as a synonym of the subspecies *S. f. freminvilli.*

Tantilla bocourti (Günther)

TCWC (3), Lower Pine-oak and Tropical Deciduous forests. Acahuizotla, 2800 ft. (2); Agua del Obispo, 3300 ft. (1). Scale formula, 15—15—15; ventrals of males, 176, 177, of female, 184; caudals of males, 43, 51, of female, 41; supralabials, 7—7; infralabials, 6—6 (1), 6—7 (1), 7—7 (1); preoculars, 1—1; postoculars, 2—2 (2), 2—3 (1); temporals, 1+1 (2), 1+2 (1) on each side. The three specimens fall within the range of variation given by Taylor (1940b). Other record: Omilteme (Smith, 1942a).

Tantilla coronadoi (Hartweg)

TCWC (1), Tropical Deciduous Forest. 3 mi. W. Chilpancingo, 5000 ft. This young male is seemingly the second known specimen of this species. In scalation, it corresponds in most respects with Hartweg's (1944) description of the type, which also came from near Chilpancingo, including the relation of the seventh supralabial to the parietal and the consequent absence of the posterior temporal. The color pattern, however, seems to differ from the type specimen. Superficially, there are three dark longitudinal stripes, most pronounced in the neck region, but under a lens, nine distinct dark stripes are evident. The lateral stripe involves mainly the third and adjacent half of the fourth scale rows as in the type. A distinct whitish spot is evident on each side between the dorsal and lateral stripes, involving the first five scales posterior to the parietals and suggesting the ''beginning'' of a white nuchal collar. A faint light line proceeds forward from each spot along the outer edges of the parietals and prefrontals to converge with the adjoining line on the internasals. Scale formula, 15—15—15; ventrals, 160; caudals, 35; supralabials, 7—7; infralabials, 6—6; preoculars, 1—1; postoculars, 2—2 (lower one minute); temporals, 1—1; seventh supralabial in contact with parietal; total length, 174 mm.; length of tail, 28 mm.

The specimen was found under a rock on the dry, rocky, slopes of the mountains between Chilpancingo and Amojileca. The vegetation there is primarily chaparral and grasses.

Thalerophis diplotropis (Günther)

TCWC (8), Lower Pine oak and Tropical Deciduous forests. Acahuizotla, 2800 ft. (6); 5 mi W. Acahuizotla, 3500 ft. (1); 2.5 mi. S. Almolonga, 5600 ft. (1). Scale formula, 15—15—11; ventrals of males, 163—172 (M—168.4), of females, 171—177 (M—173.3); caudals of males, 126—154 (M—142.0), of females, 133—147 (M—140.0); supralabials, 8—8; infralabials, 9—10 (1), 10—10 (3), 10—11 (3), 11—11 (1); preoculars, 1—1; postoculars, 2—2; temporals, 1+2 on each side. The male from Almolonga has fewer ventrals and caudals (163 and 126 respectively) and more infralabials (11) than normally found in this form. Other records: Ocotito, Chilpancingo (Oliver, 1948); Amula (Günther, 1894).

Toluca conica (Taylor and Smith)

TCWC (19), Humid Pine-oak Forest. 2 mi. W. Omilteme, 8000 ft. Scale formula, 17—17—17; ventrals of males, 120—125 (M—122.3), of females, 124—133 (M—129.5); caudals of males, 30—35 (M—32.7), of females, 21—28 (M—25.1); supralabials, 6—6 (4), 6—7 (2), 7—7 (11); infralabials, 6—6 (10), 6—7 (3), 7—7 (6); preoculars, 1—1; postoculars, 1—1 (3), 2—2 (16); temporals, 1+2 on each side; loreal, 0—0 (16), 1—1 (3). This series does not differ significantly from the description of the type and paratypes given by Taylor (1940b). Other records: Between Rincón and Cajones, Agua del Obispo (Smith, 1943); Chilpancingo (Taylor, 1940b); Tierra Colorada, Gadow, 1905).

Trimorphodon biscutatus semirutus (Smith)

TCWC (7 females), Tropical Deciduous Forest. Acahuizotla, 2800 ft. (6); 1 mi. SW Colotlipa, 2700 ft. (1). Scale formula, 25—24—16 to 25—28—19; ventrals, 259—281 (M—272.1); caudals, 85—103 (M—93.9); supralabials, 8—8 (2), 9—9 (5); infralabials, 11—11 (1), 12—12 (4), 13—13 (1), 14—14 (1); preoculars, 3—3; postoculars, 3—3; temporals, 3+3 (1), 3+4 (6) on each side; loreal, 2—2. Fugler and Dixon (in press) have discussed the relationships of this species with forms to the north and a population of the same species to the south. Other records: Agua del Obispo, between Rincón and Cajones (Smith, 1943); Tierra Colorada (Gadow, 1905).

Trimorphodon latifascia (Peters)

TCWC (5), Lower Pine-oak and Tropical Deciduous forests. *ca.* Almolonga, 5800 ft. (3); 4 mi. W. Chilpancingo, 5800 ft. (1); Palo Blanco, 4800 ft. (1). Scale formula, 21—23—15 to 26—23—15; ventrals of males, 198, 220, 221, of females, 222, 226; caudals of males, 66, 77, 78, of females, 64 (2); supralabials, 8—8 (3), 8—9 (2); infralabials, 11—12 (1), 12—12 (2), 12—13 (1), 13—13 (1); preoculars, 2—2 (1), 3—3 (4); postoculars, 3—3; temporals, 3+4 and each side; loreals, 2—2 (4), 3—3 (1); dorsal blotches, 14—17 (M—16). This series differs from those discussed by Taylor (1940b) in having a higher average number of dorsal blotches. Other record: *ca.* Chilpancingo (Hall, 1951).

Tropidodipsas guerreroensis (Taylor)

TCWC (8), Tropical Deciduous Forest. Acahuizotla, 2800 ft. These specimens have been discussed in detail by Davis (1953).

Thamnophis chrysocephalus (Cope)

TCWC (1 male), Humid Pine-oak Forest. 4 mi. W. Mazatlán, 8000 ft. Scale formula, 17—17—15; ventrals, 141; caudals, 76; supralabials, 7-8; infralabials, 9—10; preoculars, 1—1; postoculars, 3—3; temporals, 3+3 on each side. This specimen constitutes the fourth locality record for this species in Gunerrero. It apparently is restricted to the high elevations in central and northwestern Guerrero.

Thamnophis cyrtopsis cyclides (Cope)

TCWC (5), Lower Pine-oak and Tropical Deciduous forests. Acahuizotla, 2800 ft. (2); 2.5 mi. S. Almolonga, 5600 ft. (3). This is discussed in detail by Milstead (1953). Other records: *ca.* Chilpancingo (Hall, 1951; Smith, 1942d); Omilteme, Amula (Milstead, 1953).

Thamnophis scalaris godmani (Günther)

TCWC (22), Cloud and Pine-oak forests. *ca.* Omilteme, 7800-8000 ft. (17); 4 mi. W. Chilpancingo, 5800 ft. (2); 5 mi. W. Mazatlán, 8000 ft. (3). Scale formula, 17—17—17 to 21—17—17; ventrals of males, 146—153 (M—148.5), of females, 136—148 (M—141.3) caudals of males, 75—84 (M—79.6), of females, 66—84 (M—73.7); supralabials, 7—7 (18), 7—8 (2), 8—8 (2), infralabials, 9—10 (5), 10—10 (12), 10—11 (4), 11—11 (1); preoculars, 1—1 (21), 1—2 (1); postoculars, 3—3; temporals, 1+2 on each side. Other records: Amula (Günther, 1894); Omilteme (Günther, 1894; Smith, 1942d; Smith, Nixon and Smith, 1950).

Family ELAPIDAE Boie

Micrurus nigrocinctus browni (Schmidt and Smith)

TCWC (8), Lower Pine-oak and Tropical Deciduous forests. Acahuizotla, 2800 ft. (7); 10 km. SW Chilpancingo, 5800 ft. (1). Scale formula, 15—15—15; ventrals of males, 211—217 (M—214.0), of female, 225; caudals of males, 48—54 (M—52.0), of female, 42; supralabials, 7—7; infralabials, 7—7; preoculars, 1—1; postoculars, 2—2; temporals, 1+1+2 on each side. Other records: Omilteme, Chilpancingo (Boulenger, 1896; Schmidt and Smith, 1943).

Family CROTALIDAE Gray

Bothrops barbouri (Dunn)

TCWC (2 females), Cloud and Humid Pine-oak forests. 2 mi. W. Omilteme, 7800 ft. (1); 2.5 mi. SW Omilteme, 8500 ft. (1). Scale formula, 19—17—15; ventrals, 146, 144; caudals, 29, 30; supralabials, 8—9, 9—9; infralabials, 9—10, 10—10; preoculars, 2—2; postoculars, 3—3. This species apparently is not restricted to the Cloud Forest as previously thought and may have a distribution similar to that of the rattlesnakes of the area. One was taken in a humid canyon within the cloud forest, the other on a rocky ridge within the pine-oak forest. Color in life: deep brown with darker brown cross bands. Other records: Omilteme (Shreve, 1938; Dunn, 1919).

Bothrops undulatus (Jan)

TCWC (3 males), Cloud Forest. 2 mi. SW Omilteme, 7800 to 8000 ft. Scale formula, 23—21—17; ventrals, 161, 163, 165; caudals, 43, 47, 52; supralabials, 10—10, 11—11, 11—12; infralabials, 11—11 (2), 12—13

(1); anal entire, all caudals divided, supraorbital spines present. This species apparently is restricted to the cloud forest in this area, and occurs mainly in damp situations. All three specimens were taken in areas of limestone outcrops and typical cloud forest flora. Color in life of two adults, greenish-yellow, heavily suffused with black flecks; ground color of juvenile gray with black spots or flecks. Dorsal pattern of adults and juvenile consists of a mid-dorsal, ''zig-zag,'' dark brown line with coincident dark areas on the sides. Other records: Omilteme (Günther, 1895; Smith, 1941); Chilpancingo (Smith and Taylor, 1945). We question the correctness of the latter locality on ecologic grounds.

Crotalus durissus culminatus (Klauber)

TCWC (6), Lower Pine-oak and Tropical Deciduous forests. Achuizotla, 2800 ft. (5); 4 mi. W. Chilpancingo, 5800 ft. (1). Scale formula, 29—29—19 to 31—30—21; ventrals of males, 176—181 (M—179.0), of females, 181, 186; caudals of males, 28—32 (M—29.5), of females, 22, 28; supralabials, 13—14 (1), 14—14 (2), 15—15 (1), 15—16 (2); infralabials, 15—15 (2), 15—16 (1), 15—17 (2), 17—18 (1); anal entire. This form apparently has a much wider ecological distribution than was previously thought. One specimen was taken in Pine-oak Forest west of Chilpancingo. Other records: Chilpancingo, 25.7 mi. S. Chilpancingo, Omilteme (doubtful), (Klauber, 1952).

Crotalus intermedius omiltemanus (Günther)

TCWC (8 females), Cloud and Humid Pine-oak forests. 1—2 mi. W. Omilteme, 7800 to 8000 ft. Scale formula, 23—21—17, ventrals, 172—183 (M—175.6); caudals, 20—26 (M—22.0); supralabials, 8—9 (1), 9—9 (6), 10—10 (1); infralabials, 8—9 (1), 9—9 (6), 9—10 (1); Anal entire. Part of this series was reported on in detail by Davis and Dixon (1957).

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PROCEEDINGS
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A NEW RACE OF RED BROCKET DEER (*MAZAMA AMERICANA*) FROM COLOMBIA

BY PHILIP HERSHKOVITZ
Chicago Natural History Museum

The first and only known specimen of the red brocket of the Sierra Nevada de Santa Marta, northern Colombia, appears to represent a race new to science. It is named in honor of its collector and my very dear friend, Mr. Melbourne A. Carriker, Jr.

Mr. Carriker's career as a museum collector is one of the most remarkable in the history of tropical American ornithology, mammalogy and mallophagology. It began in Costa Rica in 1902 and has continued through the years in Venezuela, Peru, Bolivia, Mexico, and Colombia, with interruptions only for the study of his specialties in the museums of Washington, Philadelphia, Pittsburgh and Chicago. I met this extraordinary man for the first time in 1942 in the little sun-baked village of Valencia at the eastern base of the Sierra Nevada de Santa Marta. We were both collecting in the same region, he birds, I mammals. Carriker was already established as dean of collectors and he had long before earned a solid reputation as an ornithologist and world authority on Mallophaga. At the time of our first meeting, Carriker was already at an age when most men retire. Nevertheless, during that year, and on into the next decade when our trails crossed again the indefatigable Carriker maintained his pace as the most active and successful bird collector in the Americas. Now, in the eightieth year of his rich and colorful life, Mr. Carriker continues to add to the thousands of Mallophaga, the nearly 100,000 birds and mammals he has already collected, and to the many scientific discoveries made known through his publications and through those of others.

The following description of the red brocket of the Sierra Nevada is a contribution to the systematic revision of all Neotropical deer being prepared by the writer. I am grateful to the authorities of the U. S. National Museum for their permission to study and describe the South American Cervidae in their charge.

Mazama americana carrikeri, new subspecies

Type.—Subadult female, skin and skull, U. S. National Museum no. 282137; collected 26 February, 1946, by M. A. Carriker, Jr.

Type locality.—Mamancanaca, a high valley just south of the snow peaks of the Sierra Nevada de Santa Marta, Department of Magdalena, northern Colombia; altitude, between 3600 and 3900 meters above sea level.

Distribution.—Known only from the temperate zone of the Sierra Nevada de Santa Marta but may range from the border zone between forest and *páramo* (3500-4000 meters) to tropical zone elevations in the Sierra Nevada.

Characters.—General color of body ochraceous tawny, shoulders and nape buffy brown, the hairs of midline of nape not reversed or forming whorls; fore and hind limbs with more brown on outer sides, ochraceous on inner; flanks and rump paler than back, the drab basal portions of the hairs showing through; belly white and defined from flanks by ochraceous orange lateral line; tail with tip missing, ochraceous tawny above and without white fringe, underside with hairs white or buff basally, buffy or ochraceous terminally; hairs of inner sides of buttocks like underside of tail; forehead, muzzle, outer side and inner border of ear brown, inner side of ear white; cheeks, throat ochraceous-buff, sides of neck and chest drab; narial and mental patches white as usual in brockets; a dark brown finely drawn mandibular patch present; external opening of preorbital gland small and hardly defined from inner canthus of eye; tarsal and metatarsal tufts present but not well defined; fore and hind hoofs short and stout, their greatest width two-thirds or more length of inner upper border. Skull not significantly different from that of other red brockets; preorbital fossa shallow, or dish-shaped, as usual in *Mazama americana;* bullae slightly smaller than average.

Measurements of type.—Head and body, 964 millimeters; tail, 111; height at shoulder, 520; weight, 32 lbs.; greatest length of skull, 165; zygomatic breadth, 75 (*c.*); braincase, 53; nasals, 50; alveolar length of upper cheek teeth, 50 (m^3- not fully erupted).

Comparisons.—Mazama americana sheila Thomas of northwestern Venezuela and the Sierra de Perijá (Sierra Negra; Cúcuta), northern Colombia, differs from *carrikeri* by its more reddish, less drab, coloration of head and body, upper surface of tail with conspicuous white fringe, undersurface wholly white. *M. a. reperticia* Goldman of Panamá, and its Colombian representatives in the Departments of Bolívar and Chocó, are even more deeply reddish brown on head and body than *sheila,* the tail sharply bicolor as in *sheila,* the hairs of midline of nape partially whorled. The Andean rufous brocket, *Mazama ruçna* Pucheran from the highest altitudes in the Andes inhabited by brockets, differs markedly by its dark reddish color, blackish limbs and extremely large preorbital gland and correspondingly deep preorbital fossa.

Remarks.—The long, thick, coarse drab pelage of the temperate zone *Mazama americana carrikeri* is of the ''permanent winter'' type. In marked contrast, the more brightly colored thinner haired coat of tropical zone red brockets, is of the ''permanent summer'' type.

The type specimen of Carriker's brocket was taken at an altitude far higher than that recorded for any other representative of *Mazama americana.* No other form of brocket is known to occur in the Sierra Nevada de Santa Marta proper. The lowlands surrounding the base of the Sierra Nevada are inhabited by a race of brown brocket, *Mazama gouazoubira cita* Osgood. Thus, it appears that the red brocket of the Sierra Nevada may be completely isolated from all others of its species.

Specimens examined.—One, the type. A pickup skeleton of a subadult female (U. S. National Museum no. 281434) from the Colonia Agrícola de Caracolicito, southern slope of the Sierra Nevada de Santa Marta, altitude, 335 meters, is probably referrable to *Mazama americana carrikeri.*

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THE TYPE LOCALITY OF *FELIS CONCOLOR CONCOLOR* LINNAEUS

BY PHILIP HERSHKOVITZ
Chicago Natural History Museum

The original description of *Felis concolor* Linnaeus (1771, Mantissa Plant., p. 522) is based on a diagnosis from Brisson and references to Marcgrave, Ray and Buffon, as follows.

> ''FELIS cauda elongata, corpore immaculato fulvo.
>
> ''Felis ex flavo rufescens mento et infimo ventre albicantibus. *Briss*[*on*, 1756, *Regnum Animale*] *quadr.* 272
>
> ''Cuguacu arana *Margr*[*avius*, 1648, *Historia rerum naturalium Brasiliae*], . . . 235, *Raj. quadr.* 169. *Buff*[*on*, 1761, *Hist. Nat.*] *quadr. 9 t. 19*
>
> ''*Habitat* in Brassilia.''

Brisson's description of the puma is taken from Marcgrave and from several other references (Barrère, Ray, Klein) which are also based essentially on the Brazilian *cuguacuarana* of Marcgrave. Barrére (1741, Hist. Nat. France équinoxiale, p. 166), added a description of the puma of French Guiana to that of the *cuguacuarana*. On this authority, Brisson included *Guiane* as well as *Brésil* in the habitat of the cat. Buffon (supra cit., in text p. 217), gave the Guianas, Brazil, Paraguay, Peru, and eastern United States as the range. Linnaeus, nevertheless, gives only Brazil as the type locality. This action automatically restricts the type of *Felis concolor* Linnaeus to Marcgrave's *cuguacuarana*.

The precise place of origin of the puma described by Marcgrave is known. According to Thomas (1911, Proc. Zool. Soc. London, **1911**: 123-124), ''Marcgrave stayed at 'Moritzstadt,' now Recife, most of his time, 1640-1644, while even his excursions were limited to the coast region between 5° 45′ and 11° 11′ S., thus taking in little more than from Rio Grande do Norte to Alagoas, a region at the centre of which Pernambuco lies.'' Accordingly, authors have generally accepted ''Pernambuco'' as type locality of the animals described by Marcgrave.

In his preliminary revision of the pumas, Merriam (1901, Proc. Washington Acad. Sci., **3**:593) gave ''Brazil (probably southeastern Brazil)'' as type locality. He regarded a skull from Piracicaba, São Paulo, as representative. Merriam had no more Brazilian material than this skull, said to be deformed, and another without particular locality. Insofar as Merriam identified his Brazilian specimens with the nominal *species*, he was absolutely correct. The same would be true, had he identified Canadian pumas as zoological representatives of the *species.* On the other hand, treatment of the Piracicaba skull as "typical," by Nelson and Goldman (1929, Journ. Mammal., 10:345) and designation of the "vicinity of São Paulo" as type locality of the subspecies *Felis concolor concolor* Linnaeus is neither zoologically nor geographically correct.

In 1946, Goldman (in Young and Goldman, The puma, p. 202) recognized that his and Nelson's earlier designation of São Paulo as type locality was based "on an erroneous assumption." Unhappily, Goldman went on to reason that inasmuch as Linnaeus' principal [!] reference is to Brisson "who in turn cited Barrère as his first and main [!] authority," the type locality of *concolor* must be Cayenne, French Guiana. At the same time Goldman recognized Marcgrave's Brazilian *cuguacuarana* as the first synonym of the Linnaean *concolor* and thus nullified his own choice of French Guiana as type locality. Evidently, Goldman did not fully appreciate the fact that only Linnaeus, not Brisson or Barrère, is author of the name *concolor,* and that Linnaeus, not Goldman, is first reviser. Linnaeus' designation of Brazil as type locality and, indirectly, the *cuguacuarana* of Marcgrave as type by elimination, are unequivocal and incontrovertible.

The evidence presented here affects the status of each of several other names proposed for pumas. *Felis concolor greeni* Nelson and Goldman, based on a single specimen from Rio Grande do Norte, Brazil, is practically topotypical of the Linnaean *concolor* and becomes, therefore, an absolute synonym of it. *Felis concolor capricornensis* Goldman, based on the Piracicaba skull described by Merriam as abnormal, cannot be seriously regarded as distinct from any other Brazilian puma, particularly the nominate race.

The earliest available name for the puma of the Guianan region is *Felis discolor* Schreber. The name was proposed in 1775 in the caption to a colored plate (Säugthiere, 2: plate 104 B). The animal figured is a copy of the *black tiger* of Pennant (1771, Synopsis Quadr., pl. 181, fig. 2 [figure only, not text which is based primarily on the *jaguarété* of Marcgrave]. Schreber's formal description of *discolor* appeared two years later (1777, Säugthiere, 3:393, 586). It contains the appropriate bibliographic reference to Pennant, to the *once* of Des Marchais (1731, Voyage, 3:300) and an interrogatory reference to the Brazilian *jaguarété* of Marcgrave (1648, Hist. rerum Nat. Brasil., p. 235) which is a melanistic form of the jaguar (*Felis onca* Linnaeus). Schreber gave only South America as the habitat of *discolor.* Nothing is known of the place of origin of Pennant's *black tiger* but Des Marchais's *once,* which Schreber notes particularly, is from French Guiana. This country therefore, is here accepted as the restricted type locality of *Felis concolor discolor* Schreber.

Two names without descriptions proposed for pumas by Lesson (1842, Nouv. Tabl. Reg. Anim., p. 50), are *wavula,* from Demerara, British Guiana, and *soasoaranna* from the savannas of the Rio Orinoco, Venezuela (cf. Schomburgk, 1840, Ann. Nat. Hist., 4:325). *Felis concolor anthonyi* Nelson and Goldman (1931, Journ. Washington Acad. Sci., 21:209) from the Rio Orinoco at the base of Mt. Duida, Venezuela, is practically a topotype of *soasoaranna.* As Goldman (1946, The puma,

p. 200) places *soasoaranna* together with *wavula* in the synonymy of his *concolor* (= *discolor* Schreber) his treatment of *anthonyi* as a distinct subspecies is paradoxical. Actually the original description of *Felis concolor anthonyi* which is known from a single specimen, does not take into account either the real range of individual variation or the real geographic range of the individual and of the race to which it may belong. In any case, there is no convincing evidence that more than one kind of puma, namely, *Felis concolor discolor* Schreber, lives in the area embraced by the Rios Orinoco-Negro and Amazonas as well as the whole of the Amazonian drainage basin east of the Andes.

The above discussion may be summarized by the following classification.

Felis concolor discolor Schreber

Felis discolor Schreber, 1775, Säugthiere, 2:plite 104 B (animal *ex* Pennant, 1771, Syn. Quadr., pl. 181, fig. 2). Schreber, 1777, Säugthiere, 3:393, 586—description.

[*Felis concolor*] var. *Wavula* Lesson, 1842, Nouv. Tabl. Reg. Anim., p. 50—type locality, Demerara, Br. Guiana; nomen nudum?

Felis concolor var. *soasoaranna* Lesson, 1842, Nouv. Tabl. Reg. Anim., p. 50—type locality savannas of the Río Orinoco, Venezuela; nomen nudum?

Felis concolor var. *Niger* Lesson, 1842, Nouv. Tabl. Reg. Anim., p. 50—part, new name for *Felis discolor* Schreber.

Felis concolor anthonyi Nelson and Goldman, 1931, Journ. Washington Acad. Sci., **21**:209—type locality, Playa del Rio Base, southeast base of Cerro Duida, Amazonas, Venezuela.

Felis concolor borbensis Nelson and Goldman, 1933, Journ. Washington Acad. Sci., **23**:524—type locality, Borba, Rio Madeira, Amazonas, Brazil.

Felis concolor concolor, Goldman (not Linnaeus), in Young and Goldman, 1946, The puma, mysterious American cat, p. 200.

Felis concolor concolor Linnaeus

[*Felis*] *concolor* Linnaeus, 1771, Mantissa Plant., p. 522—name based primarily on the *cuguacuarana* of Marcgrave; type locality, Pernambuco, Brazil, by restriction (cf. Thomas, 1911, Proc. Zool. Soc. London, **1911**:123-124).

Felis sucuacuara Liais, 1872, Climats, géologie, faune et géographie botanique du Brésil, p. 461—type locality, Brazil, here restricted to the lower Rio São Francisco whence Liais recorded most of the animals he described.

Felis concolor greeni Nelson and Goldman, 1931, Journ. Mammal., **21**: 211—type locality, Curraes Novos, Rio Grande do Sul, Brazil.

Felis concolor capricornensis Goldman, in Young and Goldman, 1946, The puma, mysterious American cat, p. 246—type locality, Piracicaba, São Paulo, Brazil.

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PROCEEDINGS
OF THE
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NATURAL HISTORY OF PLUMMERS ISLAND, MARYLAND[1]

XII. A Biological Note on *Trypoxylon richardsi* Sandhouse

By Karl V. Krombein

Entomology Research Division, U. S. Department of Agriculture, Washington, D. C.

Trypoxylon (*Trypoxylon*) *richardsi* Sandh. is one of our uncommon eastern wasps and the only described member of the Rufidens Group in the United States except for the even rarer *T. bridwelli* Sandh. from Brownsville, Texas. On September 6, 1958, I found a 2-celled nest (9658 A) in a boring in soft pith of a dead twig of the fringe tree, *Chionanthus virginica,* at Plummers Island, Maryland.

The dead twig containing the nest was 12 mm. in diameter. The nest was in a boring which measured 37 mm. in length and 1.9 mm. in diameter. There was a thin clay partition at the bottom of the boring and then two cells 10 mm. long, each closed by a clay partition ½ mm. in thickness. The boring was empty above these cells. On September 6 the bottom cell held a cocoon containing a wasp prepupa. The cocoon was 7.5 mm. long and 1.5 mm. in diameter, spun of light cream-colored silk, subopaque, and very similar in appearance and texture to that of *Trypoxylon* (*T.*) *frigidum* Sm. The other cell held a number of very small, dead, immature spiders, the prey stored by the wasp. The nest was kept outdoors from October, 1958, through March, 1959, and then was brought into my office. A female of *richardsi* emerged from the cocoon on April 29.

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[1] The following numbers of this series have been published previously: I (Introduction), Proc. Biol. Soc. Wash. 48:115-117. 1935; II (Flowering plants and ferns), op. cit. 118-134; III (Mosses), op. cit. 135-137; IV (Birds), op. cit. 159-167; V (Fungi), op. cit. 49:123-131. 1936; VI (Reptiles and amphibians), op. cit. 50:137-139. 1937; VII (Hepaticae), 52:21-22. 1939; VII (Lichens), op. cit. 23-26; IX (Mammals), op. cit. 131-134; X (Flowering plants and ferns, Supplement 1), op. cit. 66:31-38. 1953; XI (Blue-green algae), op. cit. 67:239-241. 1954.

Scanty data on specimens of the Rufidens Group in the U. S. National Museum suggest that its members usually utilize abandoned borings of other insects or other cavities in twigs or stems as nesting sites. A male of *richardsi* was reared June, 1883, by T. Pergande from a twig gall on oak from "Va.". An undescribed species from Florida was reared from Rhodes grass infested with scale insects, presumably from nests in the stems. A female of *rufidens* Cam. was reared September 19, 1935, from a stem of *Vanda* sp. (a cultivated orchid) at Balboa, C. Z., Panama. *T. richardsi* has never utilized wooden traps at Plummers Island, but perhaps the smallest boring I use (3.2 mm. diameter) is too large to attract this small wasp.

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PROCEEDINGS
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A NEW STAR-NOSED MOLE (*CONDYLURA*) FROM THE SOUTHEASTERN UNITED STATES

By John L. Paradiso
U. S. Fish and Wildlife Service

According to Jackson (*North American Fauna*, No. 38, 1915, p. 90) the star-nosed mole exhibits but slight variation over a wide zonal range. Specimens from the Lower Austral Zone in Georgia and Virginia are subspecifically inseparable from those of the Boreal Zone in Quebec and Labrador. Since Jackson's review, however, additional specimens from the southeastern United States, as well as more abundant material from the type locality, indicate that a well-marked subspecies occurs throughout the southeastern States. It is here named:

Condylura cristata parva, subsp. nov.

Holotype.—U. S. National Museum No. 293291; adult male, skin and skull (skull well ossified, maxillary and nasal bones fused, tail enlarged); collected Dec. 2, 1939, by Leonard Llewellyn 5 mi. NW. of Stuart, Patrick Co., Virginia.

Distribution.—In the southern Appalachian mountains distribution extends from southeastern West Virginia and southwestern Virginia, south to western North Carolina and eastern Tennessee. In the Coastal Plain it occurs from Nansemond Co. (Dismal Swamp) and possibly Accomack Co., Virginia, to Georgia. (See map.)

When more intensive collecting is done in the piedmont section of the Carolinas, it may be found that there is a continuous distribution from the Coastal Plain to the mountains. At present, however, there are no valid records from this area. The southernmost piedmont specimens reported (not examined but, perhaps, representing *parva*) are from the Richmond, Virginia area (Bailey, *Mammals of Virginia*, 1946, p. 92).

Description.—Similar to *Condylura cristata cristata* but much smaller, both externally and cranially; tail shorter; upper ''unicuspid'' toothrow (anterior base of I3 to posterior base of Pm3) more crowded; upper ''molariform'' toothrow (anterior base of Pm4 to posterior base of M3) relatively larger; interorbital breadth relatively greater; cranium flatter and narrower; rostrum narrower.

Measurements.—Detailed measurements (as outlined by Jackson [loc. cit.]) of *Condylura c. parva* are given in the accompanying table.

Several specimens representing *parva* were examined from which it was impossible to obtain measurements. A skin of undetermined age, taken in 1917 (?), was obtained from a local trapper by Dr. Francis Harper at Mixons Ferry, Okefenokee Swamp, Georgia, and is in the collection at Cornell University.

Three North Carolina specimens preserved in alcohol, are in the North Carolina State Museum at Raleigh. One adult, collected by R. G. Vick on August 4, 1947, at Hayesville, Clay Co., North Carolina, is very small, with a short, swollen tail, and small feet. Two specimens (1 juvenile and 1 adult) with no exact locality data but probably those mentioned by C. E. Brimley (*Jour. Mamm.*, Vol. 4, No. 3, August 1923, pp. 183-184) as being from Garland, Sampson Co., and Wenona, Washington Co., also appear to represent this subspecies.

Comparative measurements.—The following measurements of adult *Condylura c. cristata* are given to show the size variation and as an aid in comparing it with *parva.*

Ten specimens from Cambridge, Massachusetts, measure (in millimeters; averages followed by extremes): Total length, 199.8 (195—208); tail vertebrae, 78.1 (76—83); hind foot, 28.4 (27—30); length of skull (average of 7); 34.6 (33.4—35.5); palatilar length (average of 8), 13.9 (13.3—14.3); mastoidal breadth (average of 7), 13.8 (13.5—14.1); interorbital breadth (average of 7), 7.3 (7.1—7.5); upper ''molariform'' toothrow (average of 7), 6.6 (6.4—6.9); upper ''unicuspid'' toothrow (average of 8), 7.8 (7.4—8.1); height of brain case (average of 7), 10.0 (9.6—10.3); maxillary breadth (average of 8), 8.7 (8.6—8.9).

An adult skull from Chester Co., Pennsylvania, (near the type locality of *cristata*) measures: Length of skull, 33.9; palatilar length, 13.7; mastoidal breadth, 13.2; interorbital breadth, 6.9; upper ''molariform'' toothrow, 6.4; upper ''unicuspid'' toothrow, 7.3; height of braincase, 9.8; maxillary breadth, 7.8.

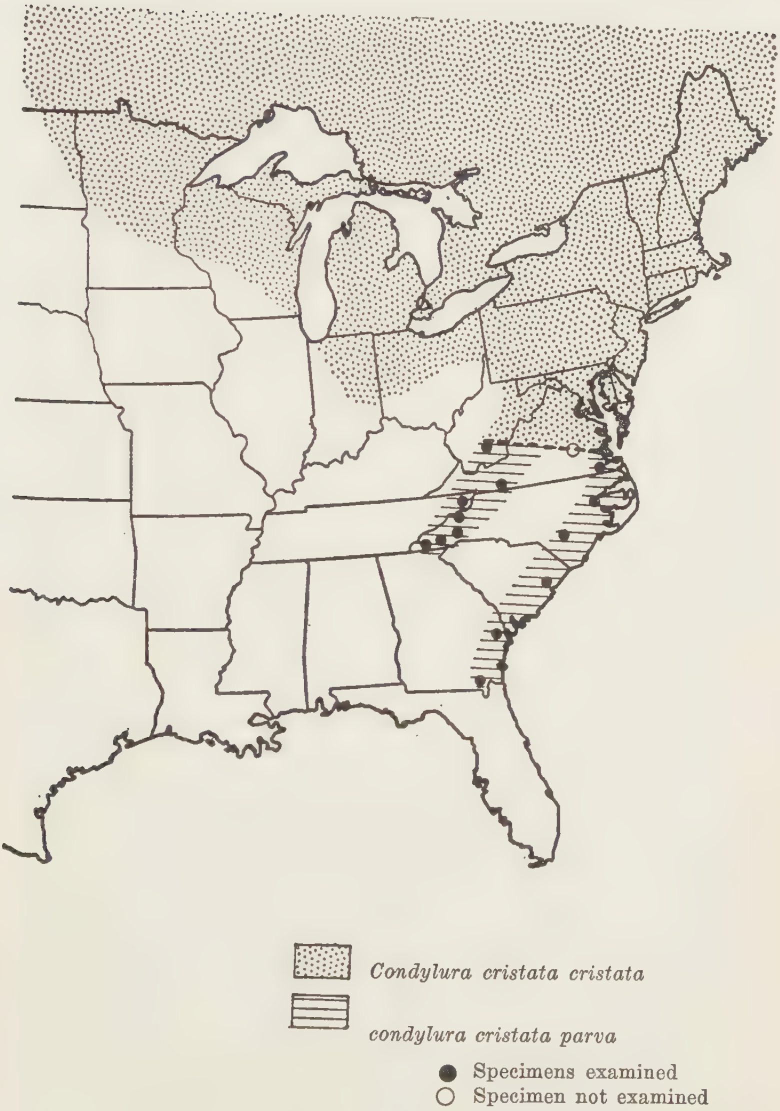
Remarks.—*Condylura cristata cristata* is best differentiated in the northern part of its range. Eastern Pennsylvania, the type locality, is within the zone of intergradation between *cristata* and *parva.* Intergrading populations occur also in Maryland, northeastern West Virginia and northern Virginia (south to Callao).

When more specimens become available, it may develop that the southern Appalachian mountain and southern Coastal Plain populations, which seem to be geographically isolated, are morphologically distinct. At present, however, no differences are apparent.

An entirely satisfactory aging technique was not developed during this study. The criteria used to distinguish adult animals are: Worn teeth; a distinctly swollen tail; an opaqueness and solidity of the skull; flatness of the cranium; and time of year when taken.

From examination of very young animals in the collection at the U. S. National Museum, it appears that maximum size in this species is reached at a very early age. Specimens in which fusion of the maxillaries and nasals has occurred at the anterior portion of the rostrum probably represent fully grown individuals.

Specimens examined.—*Condylura cristata cristata* (all in collections at U. S. National Museum; skins and skulls unless otherwise noted). 145 as follows—*Connecticut*: East Hartford, 1; Monroe, 1 (skeleton); Norfolk, 1 (alcoholic). *Delaware*: Fort Delaware, 4. *District of Colum-*



Distribution of *Condylura cristata* in the United States
(with collecting localities of *C. c. parva*)

bia: 10 (1 alcoholic). *Maine*: Eastport, 1 (alcoholic); Freeport, 1; Oakland, 1; Penobscot River (East Branch), 2; Small Point, 1. *Maryland*: Beltsville, 1; Brookville, 1; Burnt Mills, 1 (skeleton); Cabin John, 1 (alcoholic); Chevy Chase, 1; Chevy Chase Lake, 1; College Park, 2 (1 alcoholic); Ellicott City, 1 (skull only); Glendale, 1; Lanham, 1; Laurel, 2; Marshall Hall, 1; Potomac P.O., 1; Prince Georges Co., 1; Silver Spring, 1; Woodside, 2 (alcoholics). *Massachusetts*: Cambridge, 10; Gardner, 1 (alcoholic); Harvard, 1; Lunenburg, 3; Middleboro, 2; New Bedford, 1 (alcoholic); Newburyport, 2; North Abington, 1; Williamstown, 1 (alcoholic). *Minnesota*: Elk River, 1; Fort Ripley, 1; Margie, 1 (alcoholic). *New Hampshire*: Ossipee, 5. *New Jersey*: no exact locality, 1 (alcoholic); Lake Hopatcong, 5. *New York*: Cross River, 1 (alcoholic); Essex Co., 1 (alcoholic); Geneva, 2 (alcoholic); Lake George, 2; Lockport, 1; Locust Grove, 12 (5 alcoholics, 1 skin only); Lyons Falls, 1; New York City, 2 (1 alcoholic); St. Lawrence Co., 1; Sing Sing, 3 (skins only). *Ohio*: Cleveland, 1; Ellsworth, 1 (alcoholic); Garretsville, 3. *Ontario*: Hudson Bay, Moose Factory, 1 (skeleton); Ottawa, 1. *Pennsylvania*: Ardmore, 1 (skull only); Bucks Co., SW. of Falsington, near Delaware Canal, 1 (skull and partial skeleton from owl pellet); Carlisle, 2 (1 skeleton, 1 alcoholic); Chester Co., 1 (skull); Eddington, 1 (skin only); Feather Field Farm, Blueball, Montgomery Co., 1; Germantown, 1 (skin only); Hartsville, 1 (skull only); Holmesburg, Philadelphia, 1; Lake Leigh, 1; Lycoming Co., 1; Meadville, 2 (alcoholics); Radnor, 1 (skin only); Shermans Dale, Perry Co., 1; Tinicum, 1 (skull only); Williamsport, 1. *Quebec*: Grosse Isle, 1; Montreal, 1. *Vermont*: Mt. Mansfield, 2; Rutland, 1. *Virginia*: Calao, 1 (skeleton); Falls Church, 2; Lebanon, Lorton, 2. *West Virginia*: Cranberry Glades, 1. *Wisconsin*: Colby, 1; Delmar Township, Chippewa Co., 1; Herbster, 1 (skull); St. Croix Falls, 1 (skull only); Solon Springs, 4.

Condylura cristata parva (in collections at U. S. National Museum except as noted). 17 as follows—*Georgia*: Marlow, 1 adult (alcoholic, skull removed); Okefenokee Swamp, Mixons Ferry (Cornell University Collection) 1, age? (skull inside). *South Carolina*: South Island Road, 2.5 mi. S. of Georgetown, (Charleston Museum collection) 1 yg. adult. *North Carolina*: Hayesville, (North Carolina State Museum collection) 1 adult (alcoholic); Roan Mountain, Magnetic City, 1 adult, 1 young adult; Weaverville, (Museum of Comparative Zoology collection) 1 adult; Waynesville, Haywood Co., (North Carolina State College collection) 1, age?; no exact locality but presumed to be from Garland, Sampson Co., and Wenona, Washington Co., (North Carolina State Museum collection) 2 (alcoholics). *Tennessee*: Shady Valley, 1, Age? *Virginia*: Dismal Swamp, 3 young adults, 1 adult (alcoholic, skull removed); 5 mi. NW. of Stuart, Patrick Co., 1 adult (type); Accomack Co., Wattsville, 2.3 mi. E., 1 immature. *West Virginia*: Greenbrier Co., 4.2 mi. NE. of Richwood, (West Virginia Mammal Survey collection) 1 immature.

I am grateful to the following for the loan of material: The Charleston Museum, Charleston, South Carolina; The North Carolina State Museum, Raleigh, North Carolina; North Carolina State College, Raleigh, North Carolina; The West Virginia Mammal Survey; Cornell University, Ithaca, New York; The Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; and The Academy of Natural Sciences of Philadelphia.

EXTERNAL AND CRANIAL MEASUREMENTS OF *CONDYLURA CRISTATA PARVA*

Locality	Collection	Cat. No.	Sex	Age	Date	Total length	Tail	Hind foot	Greatest length of skull	Palatilar length	Mastoidal breadth	Interorbital breadth	Upper "molariform" toothrow (Pm4 to M3)	Upper "unicuspid" toothrow (I3 to Pm3)	Height of braincase	Maxillary breadth
South Carolina: South Island Rd., 2½ mi. S Georgetown	Charleston Museum	54.54	♂	ad.	3 IV 1954	165	58	25	32.4	12.4	12.6	6.9	6.3	6.7	9.0	7.8
North Carolina: Weaverville	MCZ	5399	♂	ad.	6 II 1896	—	—	—	—	12.3	—	6.7	6.5	6.1	—	7.7
North Carolina: Roan Mt., Magnetic City	USNM	66300	♂	ad.	15 III 1894	158*	57*	26*	31.6	12.1	—	6.9	6.4	6.5	8.8	7.9
North Carolina: Roan Mt., Magnetic City	USNM	91519	♂	ad.	15 VIII 1895	—	—	—	31.4	12.6	12.2	6.9	—	6.8	9.2	7.8
Virginia: Patrick Co., 5 mi. NW Stuart	USNM	293291	♂	ad.	2 XII 1939	160	60	25	32.2	12.4	12.6	6.9	6.4	7.0	8.7	7.9
Virginia: Dismal Swamp	USNM	78041	♂	ad.	1 V 1896	—	58#	25#	—	12.8	—	6.8	6.2	6.9	—	7.8
Virginia: Dismal Swamp	USNM	77815	♂	yg. ad.	7 V 1896	165	63	25	—	12.4	13.4	6.8	6.2	6.5	9.4	7.7
Virginia: Dismal Swamp	USNM	77813	♀	yg. ad.	24 IV 1896	170	62	25	32.2	12.8	13.1	7.0	6.2	6.9	9.2	8.0
Virginia: Dismal Swamp	USNM	77814	♀	yg. ad.	5 V 1896	165	62	25	31.3	11.9	12.9	6.9	5.8	6.5	9.3	7.4
Virginia: Wattsville, 2 3/10 mi. E	USNM	307428	♂	imm.	11 VI 1958	169	59	25	31.0	11.4	12.4	6.5	6.0	6.4	9.5	7.5
Tennessee: Shady Valley	USNM	267140	?	?	13 VI 1937	—	—	—	—	12.4	—	—	—	—	—	7.8
West Virginia: Richwood, 4.2 mi. NE	Mamm. Surv. W. Va.	WVMS 900	♀	imm.	—	166	57	24	30.8	12.2	12.0	6.5	6.0	6.5	9.2	—
Georgia: Marlow	USNM (alc.)	180989	♀	ad.	2 III 1913	—	56#	25#	—	—	—	—	6.0	6.4	—	—

* inches transposed to mm.

# from alcoholic skin

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PROCEEDINGS

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A NEW SPECIES OF TOAD, *BUFO CATAULACICEPS*, FROM THE ISLA DE PINOS AND WESTERN CUBA

ALBERT SCHWARTZ*

The genus *Bufo* is represented in Cuba by four species: *Bufo peltacephalus* Tschudi, *Bufo empusus* Cope, *Bufo gundlachi* Ruibal, and *Bufo longinasus* Stejneger. The latter species has been considered (Barbour, 1937:96) as composed of three subspecies: *longinasus* Stejneger, known only from the unique type from El Guamá, Pinar del Río Province; *ramsdeni* Barbour, known from a small series from the type locality in Oriente, and *dunni* Barbour, known from the vicinity of the type locality in the Sierra de Trinidad in Las Villas Province. Of the four Cuban species, *B. peltacephalus*, *B. empusus*, and *B. gundlachi* have been reported from the Isla de Pinos (Barbour, 1916:307-308 and Ruibal, 1959:5).

Under the auspices of a National Science Foundation grant, large numbers of *Bufo* were taken throughout Cuba and the Isla de Pinos in 1957 and 1958. Study of these fresh specimens has necessitated an evaluation of the other Cuban species of *Bufo;* this study has been based primarily on materials collected by myself and party, but additional material has been loaned by Dr. Doris M. Cochran, Mr. Charles M. Bogart, and Dr. Ernest E. Williams, curators respectively of the United States National Museum (USNM), the American Museum of Natural History (AMNH), and the Museum of Comparative Zoology (MCZ). Their courtesy in loan of specimens has aided the present study greatly. Dr. Richard G. Zweifel has graciously supplied me with sonograms of the voices of several species of *Bufo,* and Miss Sandra L. Bressler has ably executed the illustrations. All these persons deserve my sincere thanks for their assistance in preparing the present paper.

On the night of July 4, 1958, after a very heavy afternoon rain, which persisted until long after nightfall, a chorus of *B. gundlachi* was heard along the highway from Nueva Gerona to Santa Fé on the Isla de Pinos. Since *B. gundlachi* had not been heard chorusing on the Isla, it seemed pertinent to collect a series of this toad. As the chorus site was approached, it was evident that another anuran was calling; the second call was that of a tiny toad, of which calling males are less than an inch in length. Later during the month of July, we collected additional individuals of this new species from four other localities on the Isla de Pinos, and a total number of 68 specimens was amassed. In addition, two specimens had been taken on December 27, 1957, by Edwin B. Erickson and George R. Zug from beneath pine logs and rocks in pine land on the Isla. Thus a total of 70 specimens is available from six localities on the Isla de Pinos.

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In August, 1958, again after heavy rain, this same species of toad was heard calling at three localities in southern Pinar del Río Province. During August in Cuba the toads were much less common than in July on the Isla; it is probable that the maximum chorusing occurs in July, and the small choruses in Pinar del Río were due to the fact that the peak of the breeding season was already past. As a result, only 7 specimens were collected in Cuba.

Of the three subspecies of *B. longinasus* only the eastern *ramsdeni* has not been seen in life. We have studied, however, a single topotype of *ramsdeni;* this is an old specimen, collected by Charles T. Ramsden, and most indications of dorsal pattern have long since disappeared. Consequently, all comments on this race in the present paper may be considered as provisional, depending upon the acquisition of fresh material.

Ruibal (*op. cit.*) has made careful comparisons of *B. gundlachi* with all other West Indian toads. His data have been utilized in the present paper. However, I have examined extensive series of most Cuban forms, and pertinent comments on these are made in the paragraphs below. The new species of *Bufo* from the Isla de Pinos and western Cuba may be called.

Bufo cataulaciceps, new species

Type: AMNH 61982, from 7.9 miles north of Santa Fé, Isla de Pinos, Habana Province, Cuba, taken July 4, 1958, by Albert Schwartz and George R. Zug. Original number 5612.

Paratypes: AMNH 61973-81, 61983-91, same data as type.

Distribution: the northern two thirds of the Isla de Pinos, and western Cuba from the vicinity of La Fé east to the vicinity of Pinar del Río city, all in Pinar del Río Province.

Diagnosis: A species of *Bufo* distinguished from all other West Indian species by its small adult size (maximum size of males, 30 mm.; maximum size of females, 27 mm.), pronounced wrinkles on the lores and at the angle of the mouth, contrasting pattern of pale dorsolateral stripes against a dark background, prominent cranial crests, lateral position of the paratoid glands, and slightly webbed feet with three phalanges of the fourth toe completely free of web.

Description of type: An adult male, with the following measurements (all measurements in millimeters): snout-vent length, 23.5; length of head from snout to posterior margin of tympanum, 6.6; greatest width of head, 7.3; longitudinal diameter of eye, 2.0; naris to eye, 2.2; femur, 6.6; tibia, 7.0; fourth toe, 7.8; interorbital distance, 3.1; length of paratoid, 4.7.

The coloration of the type is dark gray (almost black) dorsally (see figure 1). There is a median fine, somewhat expanded posteriorly above the vent, gray line, in the very center of which is a pale yellowish hair line, both extending from the snout to the vent. Between the

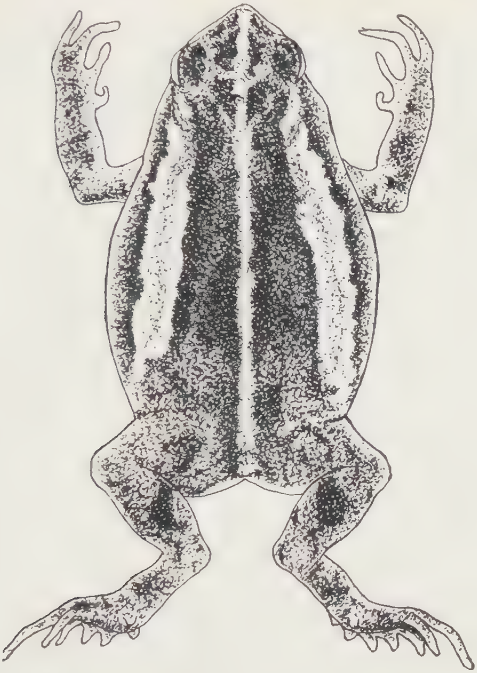

Fig. 1. *Bufo cataulaciceps,* new species, type, (AMNH 61982), dorsal aspect; snout-vent length 23.5 mm.

eyes, this median line is expanded into an irregular triangle, its apex pointed posteriorly, and its anterior side irregular and incised medially. Behind the apex of the triangle the median line is broken. Pale gray dorsolateral stripes begin at the posterior corner of the eye and extend posteriorly to the groin where they terminate by gradually becoming obscured. The dorsolateral stripes are boldly delineated both medially and laterally against the dark dorsal and lateral color, and the stripes are themselves a bit darker centrally than laterally. The lateral coloration is like that of the dorsum, and extends from the posterior margin of the eye to the groin as a sharply delineated band anteriorly, which becomes increasingly obscure posteriorly. The upper lip is dusky with a few scattered small black blotches; the supralabial line continues to above the axilla where it is white. The lower lip is immaculate. The forelimbs are dusky gray with one darker bar on the antibrachium and various irregular blotches on this same member. There is a single darker and diffuse blotch on the thigh, another on the crus, and a third on the pes, which, when the leg is flexed, combine to produce a single transverse bar across the entire dusky hindlimb. The venter is creamy white, with about twelve dusky spots on the abdomen.

The snout is relatively short and blunt, with the canthus rostralis emphasized by a prominent crest, which continues as a supraorbital

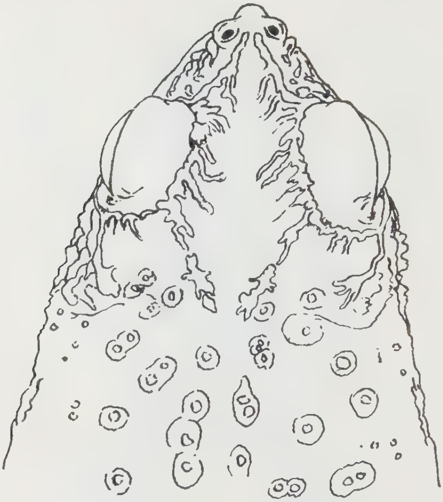

Fig. 2. *Bufo cataulaciceps*, type, dorsal aspect of head; details of pattern omitted to show structure only.

bony ridge both above and behind the eye. The median cranial crest and the supratympanic crest are both prominent and directed mesiad and are expanded posteriorly. The interorbital space, enclosed by the supraorbital crests, is completely smooth (see figure 2). The longitudinal diameter of the eye is slightly less than the distance of the eye from the naris, and the tympanum is small, inconspicuous, and close to the posterior margin of the eye. The lores, subocular area, and area above the angle of the mouth are raised into a series of prominent wrinkles or rugae (see figure 3). The dorsum is pustulose, the pustules relatively smooth and low, closely appressed to one another, and with a single

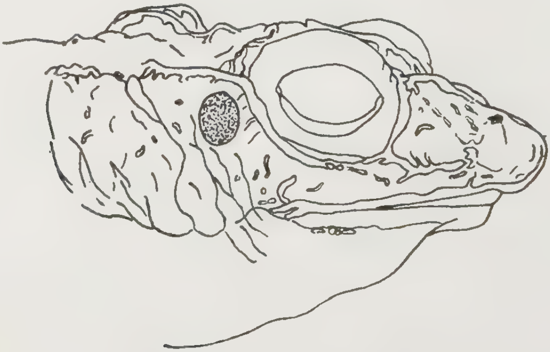

Fig. 3. *Bufo cataulaciceps*, type, lateral view of head; details of pattern omitted to show structure only.

central low spine in each wart. The dorsal surfaces of both fore- and hindlimbs are likewise pustulose with short but prominent spines. The skin of the belly and ventral surface of the limbs is covered with flattened, pavement-like granules without spines. The inner metatarsal tubercle is not keratinized. The fingers are relatively long, unwebbed, and 3-2-4-1 in order of decreasing length; the toes are slightly webbed, with the three distal phalanges of toe 4 completely free of the web. The toes are 4-5-3-2-1 in order of decreasing length.

Variation: The paratypes include 17 males and one female. From the Isla de Pinos there are, including the type and paratypes, 66 males and six females; from Pinar del Rio there are seven males. The Isla de Pinos and Pinar del Río specimens will be discussed separately.

Measurements (means and extremes) of 64 Isla de Pinos males are: snout-vent length, 23.6 (21.5—25.6); and head length, 6.9 (6.0—7.5); head width, 7.8 (7.1—8.6); longitulinal diameter of eye, 2.4 2.1—2.8); naris to eye, 2.3 (2.0—2.6); femur, 6.5 (5.5—7.5); tibia, 7.0 (6.3—7.8); fourth toe, 7.4 (6.5—8.6); interorbital distance, 3.2 (2.7—3.8); length of paratoid, 4.1 (3.2—5.6). All males but one (AMNH 61222) taken by us were calling or at least associated with choruses. Measurements of six Isla de Pinos females are: snout-vent length, 24.9 (21.3—27.2); head length, 7.0 (6.4—7.7); head width, 7.9 (7.1—8.5); longitudinal diameter of eye, 24 (2.0—2.6); naris to eye, 8.4 (2.2—2.8); femur, 6.6 (6.3—7.0); tibia, 7.3 (7.0—7.6); fourth toe, 7.9 (74—85); interorbital distance, 3.3 (3.1—3.5); length of paratoid, 4.5 (3.6—5.2). One female (AMNH 61223) was not taken from a chorus, and also shows no ovarian activity; it is the smallest of the females (snout-vent 21.3) and is likely immature. Sexual differences in size are not pronounced; females reach a slightly larger snout-vent length than males, and in general average slightly greater in all measurements taken. The vocal sac in males is spherical when distended, and not more darkly pigmented than the remainder of the venter in preserved specimens. Throats of females are white to creamy. Males have a patch of tiny dark gray to brown rugosities on the dorsal surface of the first digit of the forelimb; this patch may cover all the phalanges of this digit, and there may be an accessory but smaller patch adjacent to the base of the thumb on the palmar surface of the hand.

The coloration of the entire Isla de Pinos series is quite variable. The paratypic lot was recorded in life as being dark brown to dull olive dorsally, with the middorsal line tan to yellowish tan. The dorsolateral stripes varied from tan to yellowish tan as well, and on a single individual the dorsolateral and median bands are unicolor. The venter was recorded as white to grayish. In preserved material all dorsa are some combination of shades of browns, grays, and black. In all there is some indication of a middorsal line, varying from an incomplete hairline to the fully expressed pattern as in the type. The dorsal color is usually darker than the dorsolateral stripes, but occasional specimens show the stripes very faintly, and one is now almost black dorsally. If the dorsal color is light gray, rather than dark gray or black, there is a dorsal pattern consisting of three pairs of blotches, one scapular, one sacral and one anal; these blotches extend from the inner border of the dorsolateral stripes to the middorsal line, and may be rectangles, rhombs, diamonds, or irregular in shape. The interocular figure is present in most specimens, but it may be more extensive than that of the type. In dark individuals, the figure may be poorly demonstrated or even absent (AMNH 62014). The banding on the hindlimbs is more pronounced in lighter specimens than it is in the type, and there may be an additional band across the knee on both thigh and crus. The forelimbs as well may have the banding more prominent than the type. There are no differences between males and females in coloration and pattern.

The bellies vary greatly in pattern. Of the entire Isla de Pinos series, the majority have the bellies immaculate creamy white; at the other extreme are five specimens in which the bellies are heavily mottled or blotched with dark gray to black. All conditions of intermediacy occur in the lot.

Structurally, the series resembles the type closely. The cranial crests are always distinct and enclose a smooth interorbital space. Occasionally there is an accessory transverse ridge partially separating the interorbital area from the remainder of the dorsum. The dorsum is always pustulose with small spines. The loreal, subocular, and supra-angular rugae are prominent in all specimens. The venter is without spines in all individuals. The lack of extensive webbing on the hindfeet is likewise characteristic of all specimens.

The paratoids are lateral in position, and directed obliquely dorsomedially from the angle of the jaws toward the posterior termination of the median cranial crest. The surface of the paratoids is smooth and they are relatively inconspicuous; posteriorly the glands merge almost imperceptibly into the spinose pustules of the dorsum. The oblique orientation of the paratoids and their inconspicuousness makes measurement of these glands difficult and unreliable.

Seven males from western Cuba have the following measurements: snout-vent length, 26.4 (23.6 — 29.6); head length, 7.7 (6.9 — 8.2); head width, 8.8 (7.9 —9.6); longitudinal diameter of eye, 2.5 (2.2 — 2.8); naris to eye, 2.5 (2.3 — 2.7); femur, 7.6 (7.0 — 8.0); tibia, 8.2 (7.3 — 8.7); fourth toe, 8.8 (7.6 — 10.2); interorbital distance, 3.7 (3.3 —3.9); length of paratoid, 5.6 (4.5 — 6.3). These figures indicate that the mainland Cuban population of *B. cataulaciceps* males reaches a larger size than their Isla de Pinos relatives. It is interesting to note that the smallest of the Cuban toads, AMNH 62045, is from near the southern coast of Cuba (near La Fé); were it not for this one specimen, the Cuban and Isla populations (as far as males are concerned) would be almost completely separable on the basis of size (maximum snout-vent length in Isla males, 25.6; minimum snout-vent length in Cuban males, 25.5). In addition, there is a difference in pattern in the Cuban toads which does not occur in any of the Isla series. In all Cuban *B. cataulaciceps*, the dorsolateral stripes send a median broad extension from the inner margins toward the midline between the position of the scapular and sacral blotches; when well expressed (AMNH 62046) the extension divides the dorsum into an if the crossband is not prominent, its position is indicated by irregular and diffuse edges of the dorsolateral stripes in the area between the anterior and a posterior dark area, separated by a wide crossband. Even scapular and sacral blotches. Two Cuban specimens (AMNH 62043—44) have the dorsal pattern even more complex; here the dorsolateral stripes are almost completely obliterated by irregular black blotches, but the position of the Cuban crossband is still indicated. No Isla de Pinos specimens show any indication of this feature, and it is possible that larger size and the crossbanded pattern of Cuban toads will distinguish them subspecifically from their Isla de Pinos relatives. However, more specimens must be taken in Cuba before such a course is adopted. Certainly the situation as presently known is indicative.

Comparisons: *B. cataulaciceps* needs comparison only with the small species of Cuban toads, *gundlachi* and *longinasus* (with its races *longinasus, dunni,* and *ramsdeni).* Comparison with adult *peltacephalus* and *empusus* is unnecessary; both reach a much larger adult size (142 in *peltacephalus* males, 76 in *empusus* males). From juveniles of these two forms, *cataulaciceps* can be distinguished by having a middorsal pale line which is absent in both these species. In addition, juveniles of *B. peltacephalus* have either a vivid emerald green or reddish-fawn ground color in life and three relatively prominent paired blotches on the dorsum, and a black rather than pale interocular triangle. Juvenile *empusus* are variegated dorsally, and are much shorter limbed and narrower headed than *cataulaciceps.*

Pertinent comparisons are between *B. cataulaciceps,* and *B. longinasus* and *B. gundlachi. B. gundlachi* and *cataulaciceps* are similar in many ways, but are just as different in other. Both are small with laterally placed paratoids. Both have spinose dorsa, although the dorsa of *gundlachi* are conspicuously more spiny than those of *cataulaciceps.* The posterior medial cranial crests on *gundlachi* are usually composed of several isolated excrescences, whereas those of *cataulaciceps* are composed of a single rather regular bony ridge. The interorbital space in *gundlachi* is concave and has scattered isolated bony tubercles; this space is smooth in *cataulaciceps.* Calling male *gundlachi* from the Isla de Pinos (70 individuals) vary between 25.7 and 33.7 mm. in snout-vent length (mean, 30.0), and are thus all higher in this measurement than Isla de Pinos *cataulaciceps.* Length of tibia and length of fourth toe likewise show that the two species can be separated on this basis as well, with *gundlachi* having the higher measurements. The ratio of snout-vent length to hindlimb length will not separate the two species; Ruibal (*op. cit.*) gives the range of this ratio in *gundlachi* as 1.57 to 1.93. The ratio in *cataulaciceps* varies between 1.66 and 2.13; this is slightly higher than for *gundlachi,* but is not diagnostic. Patternwise, both *gundlachi* and *cataulaciceps* are comparable; however, the pattern elements in the latter are much more contrasting. Also, the entire snout of *gundlachi* is pale, instead of the pale color being restricted to an interocular figure as in *cataulaciceps.* Finally, the individual flattened granules on the belly of gundlachi are spinose, whereas these granules in *cataulaciceps* are without spines.

From the three races of *B. longinasus, B. cataulaciceps* can be distinguished at once by the lateral, rather than dorsal, paratoid glands. In the races of *longinasus* the cranial crests are very low and inconspicuous, in contrast to the high and conspicuous crests of *cataulaciceps.* All races of *B. longinasus* are distinctly long-snouted. The dorsa of most specimens of *dunni* and an adult female *l. longinasus* are relatively smooth, with short and inconspicuous spines in the tubercles; however, an adult female *dunni* (AMNH 60820) and an adult male *ramsdeni* (USNM 63230) are extremely spinose dorsally, and a juvenile *dunni* (AMNH 60818) is spinose as well. Apparently the degree of spinosity is a variable character within the subspecies of *B. longinasus.* The impression is that *B. cataulaciceps* is intermediate in spinosity, and that it is more spinose than most specimens of *dunni* and the seven known specimens of *l. longinasus,* but less so than some *dunni,* and *ramsdeni.*

No specimens of *B. longinasus* have the dorsolateral stripes strongly contrasting as are those of *cataulaciceps.* Rather the dorsolateral stripes in these forms merge gradually medially with the dorsal color, and are not sharply delineated from the more central dark pigment. Some *dunni* have a median light area, and, if present, this line may expand into a rhombic interorbital figure; this is roughly comparable to the condition in *cataulaciceps.* Ventrally, *ramsdeni* is much mottled with black, *dunni* is usually so mottled, but less extensively so than *ramsdeni,* and *longinasus* has a pure white belly, with three short dark brown dashes on the chest. In life, *l. longinasus* has yellowish-orange feet, inner side of arm, and jaws; this bright coloration does not occur in *cataulaciceps.* Judging from the limited material of *B. longinasus* at present available, I suspect that *ramsdeni* and *dunni* are more closely related to one another than both are to *l. longinasus.*

The lores and angle of the jaw are smooth in most *dunni* and *l. longinasus,* spinose in *ramsdeni,* and tuberculate in *gundlachi;* no other Cuban species has these areas wrinkled as does *cataulaciceps.*

The combined snout-vent/hind limb ratio for the various subspecies of *B. longinasus* from Ruibal (*op. cit.*) varies between 1.27 and 1.54; this ratio is thus well below that of *B. cataulaciceps* (1.66 to 2.13). However, the recently collected adult female *B. l. longinasus* has a ratio of 1.79, within this ratio in *cataulaciceps* but certainly nearer the lower than the higher extreme. The relatively and actually longer hindlimbs of the races of *B. longinasus* is a conspicuous feature of this species in life and easily separates them from other Cuban toads.

Comparisons of *B. cataulaciceps* with the Hispaniolan *Bufo guntheri* Cochran and the Puerto Rican *Bufo lemur* Cope are hardly necessary. These two West Indian toads are much larger than *B. cataulaciceps,* and are distinctly different structurally.

Remarks: *Bufo cataulaciceps* is, by virtue of its short and lateral paratoid glands and well developed cranial crests, a member of the *peltacephalus-empusus-gundlachi* group of Cuban toads. It shows little resemblance to *B. longinasus* and, of the *peltacephalus* group, is obviously most closely related to *gundlachi.*

On the Isla de Pinos, *cataulaciceps* was taken chorusing with both *gundlachi* and *empusus,* never with *peltacephalus.* In such choruses, *cataulaciceps* calls from the margins of temporary pools, seated either in very shallow water or on merely moist earth or gravel at the pool's edge. Males are extremely shy, and cease calling at any disturbance; this behavior is in contrast to that of both *gundlachi* and *empusus,* which customarily continue calling loudly when approached. The spherical vocal sac is rather small, and about the size of a pea in diameter.

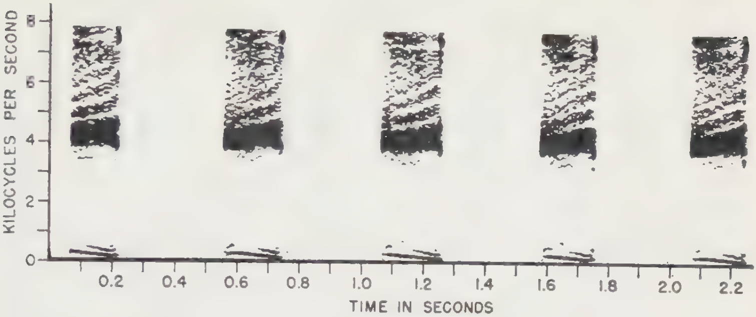

Fig. 4. Songram of call of *Bufo gundlachi*, recorded 2.8 mi. E La Mulata, Pinar del Río Prov., Cuba, 17 June 1957; temperature 23°C.

The call however, is relatively loud for such a small creature, and can be readily detected in a mixed chorus, although the ventriloqual quality of the call makes locating calling males difficult. In deep grass, *cataulaciceps* is difficult to locate, due to its shyness, small size, and very dense herbaceous cover. No choruses of *cataulaciceps* equalled in volume or number of calling males those of either *gundlachi* (which may have extensive choruses involving hundreds of vocalizing males) or *empusus* (which may have as well large choruses, both as to number of individuals and geographic area).

The calls of *B. cataulaciceps* and *B. gundlachi* are quite different. Inspection of figures 4 and 5, which are sonogram records of tape recordings of these two species, reveals that in the smaller species, the dominate frequency is 4500 kilocycles per second, as against 3000 kilocycles per second in *gundlachi.* The duration of the individual call is 0.2 seconds in *cataulaciceps* with an interval between calls of about 0.35 seconds; the individual call of *gundlachi* lasts about 1.3 seconds with a 0.2 interval between calls. The calls are thus seen to differ in dominant frequency, duration, and interval. Aurally, the call of *cataulaciceps* is reminiscent of that of *B. quercicus*, but lacks the whistling or peep-like

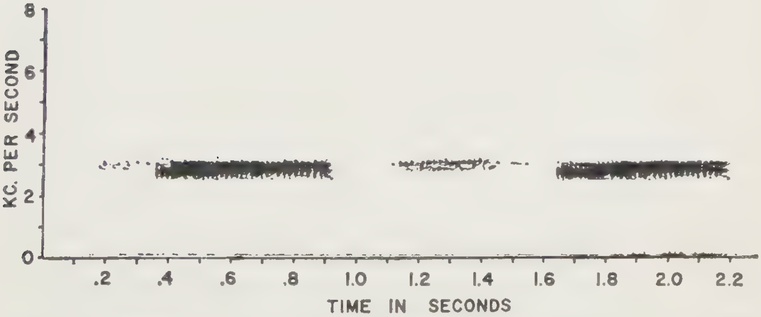

Fig. 5. Sonogram of call of *Bufo cataulaciceps*, recorded 18 mi. SSW Nueva Gerona, Isla de Pinos, 18 July 1958; temperature 25°C.

quality of the latter species; sonograms of the calls of *cataulaciceps* and *quercicus* are not at all similar.

Amplexing pairs of *cataulaciceps* as well as eggs were both collected. Amplexus is *axillary;* eggs of this species are smaller than those of *gundlachi,* and remarkably appear to be deposited in clumps rather than in typical *Bufo*-like strings. Tadpoles were raised from the eggs, and descriptions of these portions of the life history must await additional data.

The relationships of the fauna of the Isla de Pinos and western Cuba have been pointed out by other workers and by myself (Schwartz, 1959 :38). The occurrence of *B. cataulaciceps* in these two areas adds another species common to the two regions. I suspect that this diminutive *Bufo* will be found to range as far east as the vicinity of Batabanó, Habana Province, along the south coast and south of the Sierra de los Organos and Sierra del Rosario; the occurrence on the Isla de Pinos and in western Cuba of some plants such as *Pinus tropicalis, Colpothrinax wrighti,* and *Byrsonima coccolobaefolia,* all of which are typical of the habitat which *B. cataulaciceps* occupies, may well be found to delimit the area occupied by this small toad on the Cuban mainland.

Only two specimens of *B. cataulaciceps* have been taken which were not associated with choruses. These two toads were collected from beneath rocks lying on Mal Pais gravel on the Isla de Pinos, adjacent to a then dry depression in pine woods. These two individuals are the basis for Ruibal's (*op. cit.*:5) records of *B. gundlachi* from the Isla de Pinos. Although these toads are actually referrable to *B. cataulaciceps, B. gundlachi* does occur on the Isla de Pinos, as previously noted. Since *B. cataulaciceps* has seldom been taken when not involved in sexual activities, it is not improbable that it spends much of its time underground, coming to the surface to breed during extremely wet weather in midsummer.

All localities for *B. cataulaciceps* in Pinar del Río are in the lowlying Southern Coastal Plain of Pinar del Río (Llanura costera del sur de Pinar del Río) and in the Península de Guanahacabibes subregion (see Marrero, 1951). On the other hand, the type locality of *B. l. longinasus* is apparently in the Alturas de Pizarras, a pine-clad piedmont both north and south of the Sierra de los Organos. The six new specimens of this rare species were all collected in the Alturas, in gently rolling pine woods. It is possible that in Pinar del Río, *cataulaciceps* occupies the low coastal plain and *longinasus* the higher, but still xeric, piedmont. Much collecting in the very mesic Sierra de los Organos has yielded no *longinasus,* despite the fact that *dunni* (and apparently *ramsdeni* as well) are both forest inhabiters.

Specimens examined (specimens of *B. empusus* and *B. peltacephalus* not listed) *Bufo cataulaciceps*: *Isla de Pinos,* 7.9 miles north of Santa Fé, 19 (AMNH 61973—91): 12.7 miles south southwest of Nueva Gerona, 10 (AMNH 61992—62001); 18 miles southwest of Nueva Gerona, 3 (AMNH 622002—04); 5.8 miles northeast of Siguanea, 30 (AMNH 62005—34); 5 miles northeast of Siguanea, 2 (AMNH 61222—23); 2 kilometers north, 14.4 kilometers west of Santa Fé, 6 (AMNH 62035—40); Júcaro, 1 (MCZ 30860); Santa Fé 1 (MCZ 30862). *Cuba,* Pinar del Rio, 6.5 miles southeast of Pinar del Río, 4 (AMNH 62041—

44); 6.4 miles southwest of Isabel Rubio, 2 (AMNH 62046—47); 1 mile southeast of La Fé, 1 (AMNH 62045).

Bufo gundlachi: *Isla de Pinos,* 2.1 miles north of Santa Fé, 33 (AMNH 63152); 1.3 miles south southwest of Nueva Gerona, 15 (AMNH 63153); 2 kilometers east of Santa Barbara, 10 (AMNH 63154); 7.9 miles north of Santa Fé, 9(AMNH 63151); nr. Sante Fé, 3 (MCZ 30859, 30861, 30863); 1.8 miles south of Nueva Gerona, 4 (AMNH 63155). *Cuba, Pinar del Río,* 2.3 miles east of La Mulata, 4 (AMNH 60821—24); 2.8 miles east of La Mulata, 4 (AMNH 60825—28): 2.9 miles east of Isabel Rubio, 1 (AMNH 60829); 6.5 kilometers southeast of Pinar del Río, 6 (AMNH 62050); 2.5 miles south, 7 miles east of Herradura, 55 (AMNH 60830—56, 61474—75, 61830—39, plus sixteen untagged specimens); 5.5 miles east of Candelaria, 29 (AMNH 60890—918): *Habana,* 1.5 kilometers east of Campo Florido, 59 (AMNH 63156); *Matanzas,* 1.5 miles west of Canasí, 5 (AMNH 62049); Las Villas, 28 kilometers east of Trinidad, 6 (AMNH 60884—89); 2 kilometers southeast of Aguada de Pasajeros, 19 (AMNH 62048); *Camagüey,* Embarcadero de Morón, 1 (AMNH 60857); 9.4 miles south of Contramaestre, 26 (AMNH 60858—83).

Bufo l. longinasus: *Cuba, Pinar del Río,* El Guamá, 1 (USNM 27419); 19.5 kilometers northeast of Pinar del Río, 6 (AMNH 61648—52, 61972)

Bufo l. dunni: *Cuba, Las Villas,* 4 kilometers west, 12 kilometers north of Trinidad, 14 (AMNH 60806—19); Topes de Collantes, 1 (AMNH 60820); 0.9 miles south of Topes de Collantes, 4 (AMNH 60802—05).

Bufo l. ramsdeni: *Cuba, Oriente,* Los Hondones, Guantánamo, 1 (USNM 63230).

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PROCEEDINGS

OF THE

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TWO NEW SUBSPECIES OF BIRDS FROM THE SAN LUIS MOUNTAINS OF VENEZUELA AND DISTRIBUTIONAL NOTES

By William H. Phelps and William H. Phelps, Jr.

The San Luis Mountain Range is in the extreme northern part of the State of Falcón at the base of the Paraguaná Peninsula. It is isolated and has a lower subtropical fauna but the altitudes are not greater than 1400 meters. The range is 35 miles long from east to west and not more than 7 miles wide. We have previously described a number of new endemic forms from there. The affinity of the avifauna is more towards the Caracas Region than to the Mérida Region.

Besides describing the new subspecies we have added some taxonomic and distributional notes. We wish to thank the Curators of the U. S. National Museum and American Museum of Natural History for access to their collections.

Specimens listed are in the Phelps Collection, Caracas, unless otherwise specified. Names of colours are capitalized when direct comparison has been made with Ridgway's ''Color Standards and Colour Nomenclature,'' 1912. Wing measurements are of the chord.

Oceanites oceanicus oceanicus (Kuhl)

Procellaria oceanica Kuhl, Beitr. Zool., Vergl. Anat., *1*, p. 136, 1820. (South Atlantic.)

♂. Placer de La Guayra, high seas 15 kilometers off the north coast, July 26, 1958.

This specimen extends the range of the species to the high seas off the northern coast. Sight records have been cited by Cory and by Beebe; see Phelps and Phelps, Jr., Lista de las Aves de Venezuela con su Distribución[1].

Coeligena coeligena zuloagae, new subspecies

Type: From Curimagua, Sierra de San Luis, Estado Falcón, Venezuela; 1300 meters. No. 63357, Phelps Collection, Caracas. Adult male collected April 18, 1957, by Ramón Urbano. (Type on deposit at American Museum of Natural History.)

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[1] Tomo 2, Parte 1, Bol. Soc. Ven. Cien. Nat., No. 90, p. 16, 1958.

Diagnosis: Nearest to *C. c. coeligena* (Lesson) of the Caracas Region but differs from all races by chin and breast being dusky olivaceous, with feathers faintly margined with whitish, giving a lined appearance, instead of whitish with olivaceous spots; bill shorter.

Range: Known only by the type specimen, from the Subtropical Zone.

Description of Type: Top of head, neck and mantle nearest to Claret Brown; lower back and rump greenish, feathers basally barred with bronze; upper tail-coverts brownish bronze; lores black. Chin and throat dusky olivaceous, feathers narrowly margined with grayish white, giving a lined appearance; breast, sides and abdomen bronzy, faintly barred with greenish; a white patch on anal area, feathers brown basally; under tail-coverts bronze heavily margined with Sanford's Brown. Remiges and greater upper wing-coverts Dark Vinaceous Drab; lesser coverts and bend of wing Claret Brown. Tail shiny bronze.

Bill (in life) "black;" feet "black;" iris "dark." Wing, 71 mm.; tail, 48; exposed culmen, 27; culmen from base, 31; tarsus, 6.

Remarks: Size similar to *C. c. coeligena*. Measurements of *coeligena*: four adult males—wing (3), 74—78 (76.7) mm.; tail, 47—52 (49.7); exposed culmen 30—32 (30.5.).

Specimens Examined

C. c. coeligena—VENEZUELA: Caracas Region, 8[2]; El Junquito, Dist. Federal, 2 (?); Cerro El Avila, 2 ♀, 1 (?).

C. c. zuloagae.—VENEZUELA: Curimagua, Sierra San Luis, Falcón, 1 ♂ (type).

C. c. zuliana.—VENEZUELA: Perijá Mountains, Zulia, 6[2].

C. c. columbiana.—VENEZUELA: Mérida Region, 4[2]; Río Chiquito, Táchira, 5 ♂, 2 ♀, 4 (?). COLOMBIA[3]: 11[2].

C. c. ferruginea.—COLOMBIA[3]: 18[4].

C. c. obscura.—ECUADOR[3]: 23[4].

C. c. boliviana.—BOLIVIA[3]: 5[4].

Myrmeciza disjuncta Friedmann

Proc. Biol. Soc. Wash., No. 50, p. 83, June 30, 1945. (Cerro Yapacana, Upper Orinoco, Venezuela.)

3 ♂, 2 ♀, Cerro Yapacana, April and May, 1947.

Friedmann had only an immature ♂ and an adult ♀. The imm. ♂ was chosen as the type. The adult male had been unknown until we collected these specimens at the same locality sixteen years later. The coloration of these is very different from that of the immature type and we describe it here.

Adult ♂. Phelps Collection No. 39340. Top of head, neck, back and uropygium Blackish Brown; a large concealed white patch on back; sides of head, neck, throat, breast, abdomen and thighs white; under tail-coverts grayish white; remiges Fuscous; upper wing-coverts blacker, tipped with white, making three interrupted wing-bands.

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[2] For localities see Phelps and Phelps, Jr., Proc. Biol. Soc. Wash., *66*, p. 1, March 30, 1953.

[3] Specimens in American Museum of Natural History.

[4] For localities see Zimmer, Am Mus. Nov., No. 1513, p. 25, May 31, 1951.

Measurements: three adult males—wing, 60—61 (60.3) mm.; tail, 44—46 (45); culmen from base, 19—20 (19.6); tarsus, 24—24 (24); two adult females—wing, 59—59 (59), tail, 45—45 (45); culmen from base, 20—20 (20); tarsus, 23—24 (23.5).

Corapipo gutturalis (Linné)

Pipra gutturalis Linné, Syst. Nat., 12° ed., *1*, p. 340, 1766. (Cayenne.)

Corapipo gutturalis carminae Barnés, Auk, p. 412, 1955. (Cerro Marahuaca, Terr. Amazonas, Venezuela.)

Of the 15 ♂, 17 ♀ and 2 ♂ juv. in our collection, collected from 1938 to 1948[5], the senior author took the 17 ♀ and the 2 ♂ juv. to the U. S. National Museum in 1957 for comparison with the type of *C. g. carminae*, listed as an adult ♀. He found the type similar to our 2 ♂ juv.

Specimens in our Collection

VENEZUELA: Cerro Auyan-tepui, Bolívar, 2 ♂; Carabobo, Río Cuyuni, 5 ♂. 1 ♀; Cerro Paurai-tepui, 4 ♂, 8 ♀; Salto Maiza, Río Paragua, 1 ♂, 1 ♂ juv., 1 ♀; Salto María Espuma, 1 ♀; Cerro El Negro, Río Cuchivero, 2 ♂, 1 ♂ juv., 5 ♀; Taracuniña, Alto Caura, 1 ♂. BRITISH GUIANA: Paruima Mission, Kamarang River, 1 ♂.

Cotinga nattererii (Boissonneau)

Ampelis nattererii Boissoneau, Rev. Zool., *3*, p. 2, 1840. (''Bogotá.'')

1♀, Santa Elena, Rio Frío, Mérida; forest at 20 meters altitude.

This specimen constitutes an extension of range of the species to Venezuela from the Magdalena Valley in Colombia.

Rynchocyclus fulvipectus (Sclater)

Cyclorhynchus fulvipectus Sclater, Proc. Zool. Soc. London, *28*, p. 92, 1860. (Nanegal, Ecuador.)

1 ♂, Río Chiquito, Estado Táchira, Feb. 19, 1956; 1800 meters.

This specimen constitutes an extension of range to Venezuela from the western slopes of the Eastern Andes of Colombia. Río Chiquito is a forested region in extreme southwestern Táchira on the eastern slopes of the Páramo de Tama massif.

Tyranniscus uropygialis (Lawrence)

Mecocerculus uropygialis Lawrence, Ann. Lyc. Nat. Hist. New York, *9*, p. 266, 1870. (''Ecuador.'')

2 (?), Páramo de La Negra, Mérida, Nov. 2 and 3, 1958, 3,100 meters.

These specimens extend the range of the species to Venezuela, in the Temperate Zone, from the Bogotá region of Colombia where it is known in the Subtropical Zone.

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[5] Phelps and Phelps, Jr. Lista de las Aves de Venezuela con su Distributión. Bol. Soc. Ven. Cien. Nat.. No. 75, p. 137, 1950.

Henicorhina leucophrys sanluisensis, new subspecies

Type: From Curimagua, Sierra de San Luis, Estado Falcón, Venezuela; 1300 meters. No. 63465, Phelps Collection, Caracas. Adult male collected April 17, 1957, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from the other four Venezuelan subspecies of *H. leucophrys* (Tschudi) by darker back and uropygium, more brownish, less reddish; from *H. l. venezuelensis* Hellmayr, of the Caracas Region, differs additionally by darker breast and abdomen, more grayish, less whitish; from *H. l. meridana* Todd, of the Mérida Region, differs additionally by immaculate throat, instead of streaked and darker flanks and crissum; from *H. l. tamae* Zimmer and Phelps, of the Tamá Region, differs additionally by immaculate throat and in having the brown of flanks and crissum darker and more restricted; and from *H. l. manastarae* Aveledo and Ginés, from the Perijá Region, differs additionally by darker brown flanks and crissum.

Range: Known from the San Luis Mountains in northern Falcón, in the Subtropical Zone at 1300 meters.

Description of Type: Top of head dusky with dark olivaceous blotches; back, scalpulars and uropygium darker than Auburn; superciliary stripe from bill to neck white; lores and ear-coverts black; malar region, cheeks and sides of neck black, heavily streaked with white. Chin and throat white merging into near Light Mouse Gray of breast and sides which becomes more whitish on abdomen; flanks and crissum Antique Brown. Remiges Benzo Brown; outer webs of tertials barred Auburn and black; wing-coverts margined with Auburn; under wing-coverts and axillaries grayish. Rectrices olivaceous barred with black.

Bill (in life) "black;" feet "grayish brown;" iris "dark." Wing, 58 mm.; tail, 28; exposed culmen, 15; culmen from base, 18; tarsus, 26.

Remarks: Sexes alike. Size similar to *venezuelensis*. Range of measurements: two adult males (including type)—wing, 54—58 (56) mm.; tail, 24—24 (24); culmen from base, 18—18 (18); two adult females—wing 52—54 (53); tail, 24—26 (25); culmen from base, 16—17 (16.5). Measurements of *H. l. venezuelensis*: five adult males—wing, 54—57 (56); tail, 26—28 (27.5); culmen from base, 18—19 (18.5); five adult females—wing, 52—54 (53); tail, 25—27 (25.6); culmen from base, 17—18 (17.6).

Specimens Examined

H. l. manastarae.—VENEZUELA: Cerro Pejochaina, Perijá, Zulia, 2 ♂, 6 ♀, 8 (?); Kunana, 1 ♀, 3 (?); Cerro Mashirampé, 1 ♂, 2 (?); Divisorio ríos Macoita y Apón, 1 ♂, 1 ♀.

H. l. tamae.—VENEZUELA: Páramo de Tamá, Táchira, 7 ♂, 6 ♀, 1 (?); Río Chiquito, 15 ♂, 6 ♀, 10 (?).

H. l. meridana.—VENEZUELA: Mesa de Lino, Santo Domingo, Mérida, 2 ♂, 1 ♀, 2 (?); Mérida Region, 20[6].

H. l. sanluisensis.—VENEZUELA: Curimagua, Sierra San Luis, Falcón, 2 ♂ (inc. type), 1 ♂ juv., 2 ♀, 1 (?), 1 (?) juv.

H. l. venezuelensis.—VENEZUELA: Caracas Region, 28[6]; Bucaral, Yaracuy, 1 ♂, 1 ♀; El Junquito, Dto. Federal, 1 (?); Cerro El Avila, 1 ♂, 2 (?); Cerro Negro, Miranda, 1 ♂, 2 ♀, 2 (?).

Hylocichla minima bicknelli Ridgway

In our Check List[7] we listed this form from Venezuelan localities and also gave it a Colombian range. All this was in error as our specimens are *H. m. minima.*

Vermivora chrysoptera X Vermivora pinus

Helminthophaga leucobronchialis Brewster, American Sportsman, *5*, p. 33, Oct. 17, 1874. (Newtonville, Mass.)

1 (?). Río Chiquito Hacienda La Providencia, Estado Táchira; forest at 1800 meters.

This specimen of the hybrid Brewster's Warbler, with pure white under parts, is similar in color to these two specimens in the American Museum of Natural History: ♂. Valle, Mérida, Venezuela and ♂, Bonilla, Costa Rica. The latter specimen, which he calls a "back-cross," is illustrated by Kenneth C. Parkes[8] in the plate facing page 5 of his exhaustive exposition on the genetics of this hybrid.

As far as we know, this is the second specimen of Brewster's Warbler collected in Venezuela or in South America. One of the parent species, *V. chrusoptera,* occurs regularly during the winter in Colombia and in Venezuela but the other, *V. pinus,* is known from South America only by a specimen taken in March at Chirúa, in the Santa Marta Mountains of Colombia[9].

Parkes lists a specimen of Lawrence's Warbler, *V. lawrencii* (Merrick), hybrid between *V. pinus* and *V. chrysoptera,* in the American Museum of Natural History, from Cumbre de Valencia, Venezuela, January 31, 1910. We believe that this is the only record from South America.

Arremon tocuyensis (Todd)

Arremonops tocuyensis Todd, Ann. Carnegie Museum, p. 198, 1912.

Following de Schauensee[10], in our Check List[11] we listed this bird as a subspecies of *A. conirostris* (Bonaparte). de Schauensee says that *tocuyensis* is found in the Río Hacha region of Colombia at Arroyo de Arenas, only eight miles distant from Loma Larga where *A. c. conirostris* occurs.

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[6] For localities see Zimmer and Phelps, Am. Mus. Nov., No. 1270, p. 14, Dec. 26, 1944.

[7] Lista de las Aves de Venezuela con su Distribución. Bol. Soc. Ven. Cien. Nat., 75, p. 249, 1950.

[8] The Genetics of the Golden-winged X Blue-winged Warbler Complex. Wilson Bulletin, *63*, No. 1, pp. 5-15, March, 1951.

[9] R. M. de Schauensee. The Birds of Colombia, p. 965, 1951.

[10] The Birds of Colombia. Caldasia, *5*, No. 25, p. 1108, Aug. 31, 1951.

[11] List de las Aves de Venezuela con su Distribución, Pt. 2, Passeriformes. Bol. Soc. Ven. Cien. Nat., *12*, No. 75, p. 307, 1950.

We now find that the two birds occur in Venezuela in the same locality at Mirimire on the eastern coast of the State of Falcón at 250 meters altitude. On December 6, 1957, we collected a male of *A. tocuyensis* there and on the 11th a male of *A. c. conirostris.* On the 3rd we had already collected a male of *A. tocuyensis* at San Juan de los Cayos, 27 miles to the east. We also have specimens of *tocuyensis* from Paraguaipoa at the base of the Goagira Peninsula, Cerro Santa Ana on the Paraguaná Peninsula and San Miguel, Lara, near Barquisimeto.

A. c. conirostris is a common bird throughout Venezuela from the Orinoco River northward. From the semi-arid region occupied by *A. tocuyensis* we have specimens of *A. c. conirostris* from the San Luis Mountains and Quebrada Arriba, Lara; also from Cerro Alto del Cedro on the border of Colombia at the foot of the Goagira Peninsula.

Inasmuch as *A. tocuyensis* is a larger bird in wing, bill and tarsus, and has differences in coloration, and as it has now been found in the same locality as *A. c. conirostris,* we agree with Hellmayr[12] that *tocuyensis* should rank as a species.

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[12] Catalogue of Birds of the Americas, etc., Part XI, p. 443, 1938.

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TAXONOMY AND NOMENCLATURE OF SOME POCKET GOPHERS FROM SOUTHEASTERN ARIZONA

Kenneth I. Lange, c/o U. S. National Museum

This paper is based upon a taxonomic and distributional study of pocket gophers in southeastern Arizona, namely, Cochise County, Santa Cruz County, and the eastern third of Pima County. Because of the marked sexual dimorphism of pocket grophers, a holotype and an allotype have been designated for each new form. Measurements are in millimeters and color standards are after Ridgway (1912). The following abbreviations are used in the lists of specimens examined:

BS—Biological Surveys Collection of the Fish and Wildlife Service, U. S. National Museum, Washington, D. C.
KU—Museum of Natural History, University of Kansas, Lawrence.
UA—Department of Zoology, University of Arizona, Tucson.
UI—Museum of Natural History, University of Illinois, Urbana.

I wish to thank the authorities in charge of the mammal collection at the U. S. National Museum for their courtesies, and E. Raymond Hall at the University of Kansas and Donald F. Hoffmeister at the University of Illinois for the loan of specimens.

Two species of pocket gophers, *Thomomys bottae* and *Thomomys umbrinus*, are believed to occur within the study area (Lange, MS., Univ. Ariz. Libr., 1958). *T. bottae* is represented by nine subspecies and *T. umbrinus* by the following two:

Thomomys umbrinus intermedius Mearns

Thomomys fulvus intermedius Mearns, Proc. U. S. Nat. Mus., 19:719, July 30, 1897, type from summit of the Huachuca Mountains, 9,000 feet, Cochise County, Arizona.

Thomomys burti Huey, Trans. San Diego Soc. Nat. Hist., 7:158, July 28, 1932, type from Madera Canyon, 6,000 feet, Santa Rita Mountains, Santa Cruz County, Arizona.

Thomomys umbrinus intermedius, Nelson and Goldman, Jour. Mamm., 15:117, May 16, 1934.

Thomomys umbrinus burti, Nelson and Goldman, Jour. Mamm., 15:117, May 16, 1934.

Thomomys burti burti, Burt and Campbell, Jour. Mamm., 15:151, May 16, 1934.

Thomomys umbrinus burti, Goldman, N. A. Fauna 59:34, June 12, 1947.

Thomomys umbrinus intermedius, Goldman, N. A. Fauna 59:35, June 12, 1947.

Thomomys bottae proximus, Hoffmeister and Goodpaster, Ill. Biol. Monog., 24(1):98, December 31, 1954 [in part; specimens from Canelo Gate and one mile north of Fort Huachuca].

Thomomys umbrinus quercinus Burt and Campbell

Thomomys burti quercinus Burt and Campbell, Jour. Mamm., 15:150, May 16, 1934, type from Pena Blanca Spring, 4,500 feet, near Mexican boundary, north of monument 128, Pajarito Mountains, Santa Cruz County, Arizona.

Thomomys umbrinus quercinus, Goldman, N. A. Fauna 59:35, June 12, 1947.

Burt and Campbell (Jour. Mamm., 15:150, 1934) distinguished *quercinus* from *burti* (*T. burti burti* = *T. umbrinus burti*) in the following manner: ". . . color of sides distinctly paler with a yellowish instead of a deep chestnut cast; dark median dorsal stripe less pronounced and extending only to the rump. Skull differs in slightly larger size; larger interparietal; termination of nasals farther anteriorly with respect to the zygomatic arm of the maxillary . . .; pterygoids, as viewed from ventral surface, weaker and V-shaped instead of U-shaped as in *burti,* and lacking the distinct process which projects laterally and ventrally from each wing in *burti.*" Examination of the available material reveals that of these characters the following will distinguish *quercinus,* known only from the type locality, from *burti* from the Santa Rita and Patagonia mountains: color of the sides; less pronounced dorsal stripe; in most specimens, the more anterior termination of the nasals; and the nature of the pterygoids.

Gophers referable to *T. umbrinus* from the Huachuca Mountains, however, exhibit intergradation between *quercinus* and *burti.* Specimens of *T. umbrinus* from Brown Canyon, from eight miles west of Fort Huachuca, and from one mile north, four miles west of Fort Huachuca resemble *quercinus* on the basis of the pterygoids; some resemble *quercinus* while others are like *burti* in nasal termination; and the specimens from eight miles west of the Fort resemble both *quercinus* and *burti* in pelage color, whereas specimens from Brown Canyon and from the Santa Rita Mountains are indistinguishable in pelage color.

The type specimen of *T. fulvus intermedius* (= *T. umbrinus intermedius*) exhibits the same morphological features indicative of intergradation between the more definable *quercinus* and *burti*: this specimen is like *quercinus* in the nature of the pterygoids; is almost intermediate in respect to nasal termination; and resembles *burti* from the Santa Ritas in pelage color, being only slightly darker on the dorsum and only slightly deeper Hazel on the sides. It measures as follows: total length, 200; tail, 66; hindfoot, 26; basilar length, 31.6; least interorbital constriction, 6.9; mastoidal breadth, 16.4; length of nasals, 12.1; breadth of rostrum, 7.1; length of rostrum, 16.0; alveolar length of maxillary toothrow, 7.3; and palato-frontal depth, 14.3.

Pocket gophers referable to *T. umbrinus* from the Santa Ritas and Patagonias and those from the Huachucas are thus placed under one subspecies, viz., *intermedius.* These areas and Pena Blanca Spring are the only localities from which *T. umbrinus* is known in Arizona at the present time. The species *umbrinus* has not been reported from Sonora, Mexico; the subspecies *quercinus* is known only from Pena Blanca Spring. However, *quercinus* may have a larger range than is presently known: it may range through oaks (the usual habitat of *T. umbrinus* in Arizona) from Pena Blanca Spring into Sonora on the south and west sides of the Santa Cruz Valley and come back into Arizona in such localities as the oak zone of the Huachuca Mountains. Further, *T. umbrinus* may range through oaks from the Santa Rita and Patagonia mountains to the Huachucas. Gene exchange between these gophers might be taking place by such a route. Although the type specimen of *intermedius* comes from an aspen and spruce zone, the preferred habitat of *T. umbrinus* appears to be in the vicinity of oak growth.

The following specimens are referred to *T. u. intermedius.* Total, 41, distributed as follows: *Pima County*: Santa Rita Mts.: NW slope, 1-1-½ m. S, 1-1-½ m. E Old Parker Ranch, 4,300-4,500 ft., 5 (KU); 9-½ m. SE Continental [near mouth Madera Canyon], 4,300 ft., 2 (KU); Madera Canyon, 4,600 ft., 4 (KU); Madera Canyon, 5,000 ft., 4 (KU). *Santa Cruz County*: Santa Rita Mts.: Madera Canyon, 6,000 ft., 1 (KU); Madera Canyon, 6,200 ft., 1 (KU); Agua Caliente Canyon, 7-½ m. E Amado, 4,500 ft., 4 (UA). Patagonia Mts.: 1 m. E Guajolote Corral, 5 m. N, 13 m. E Nogales, 5,500 ft., 1 (KU); Guajolote Corral, 5 m. N, 12 m E Nogales, 5,800 ft., 1 (KU). *Cochise County*: Huachuca Mts.: summit, 9,000 ft., 1 (BS); E slope, Brown Canyon (between Ramsay Canyon and Ft. Huachuca Reservation), 5,700 ft., 3 (KU); Brown Canyon, 5,400 ft., 2 (KU); Brown Canyon, 5,300 ft., 6 (KU); W slope, Panama Mine, Canelo Gate (= 8 m. W Ft. Huachuca), 5 (UI); 1 m. N, 4 m. W Ft. Huachuca, 1 (UI).

Hoffmeister and Goodpaster (Ill. Biol. Monog., 24:95, 1954) believe that: ". . . in the Huachucas, and perhaps in all of southern Arizona, gophers regarded as *T. umbrinus* by Goldman (1947) are best referred to *T. bottae.*" (If these two forms are conspecific, the earliest name would be *T. umbrinus*). They thus refer specimens of gophers from the northwest slope of Carr Peak, 8,400 feet, to the species *T. bottae* and to the subspecies *T. bottae intermedius* Mearns, regarding *T. fulvus intermedius* Mearns as a synonym. However, *T. bottae* and *T. umbrinus* are now believed to be distinct, and, accordingly, *T. fulvus intermedius* Mearns (*T. umbrinus intermedius* Mearns) is retained. A new name thus becomes necessary for the Carr Peak population of *T. bottae.* This form is named and described as follows.

Thomomys bottae carri, new subspecies

Thomomys bottae intermedius, Hoffmeister and Goodpaster, Ill. Biol. Monog., 24(1):95, December 31, 1954 (not *Thomomys fulvus intermedius* Mearns).

Holotype:—Male, skin and skull, no. 4185, University of Illinois, Department of Zoology, Urbana, Illinois; Huachuca Mountains, northwest slope, Carr Peak, 8,400 feet, Cochise County, Arizona; collected by Richard G. Van Gelder, original number 183.

Allotype:—Female, skin and skull, no. 4186, University of Illinois, Department of Zoology, Urbana, Illinois; Huachuca Mountains, northwest slope, Carr Peak, 8,400 feet,, Cochise County, Arizona; collected by Donald F. Hoffmeister, original number 1544.

Description:—A relatively small form for the study area. Study material consisted of eight males and four females. The holotype measures as follows: total length, 220; tail length, 60; hindfoot, 30; basilar length, 31.4; zygomatic breadth, 22.1; least interorbital constriction, 6.3; mastoidal breadth, 16.6; length of nasals, 12.4; breadth of rostum, 7.3; length of rostrum, 16.3; alveolar length of maxillary toothrow, 7.5; and palato-frontal depth, 15.1. In the same order, the males, including the holotype, give average, minimum, and maximum measurements as follows (only five measurements of zygomatic breadth; seven of mastoidal breadth; seven of nasal length; and seven of rostral length): 209.3 (190-220); 62.1 (50-71); 28.5 (26-30); 31.8 (30.2-33.2); 22.3 (21.9-23.6); 6.6 (6.2-6.9); 16.7 (16.0-17.6); 12.7 (11.7-13.7); 7.4 (6.9-8.0); 16.0 (15.4-16.4); 7.6 (6.9-8.2); and 14.1 (13.3-15.1). The allotype measures as follows: total length, 215; tail length, 60; hindfoot, 28; basilar length, 30.0; zygomatic breadth, 21.3; least interorbital constriction, 6.4; mastoidal breadth, 16.4; length of nasals, 11.9; breadth of rostrum, 7.6; length of rostrum, 15.3; alveolar length of maxillary toothrow, 7.7; and palato-frontal depth, 13.1. In the same order, the females, including the allotype, give average, minimum, and maximum measurements as follows (only two measurements of zygomatic breadth): 203.3 (190-215); 63.5 (59-68); 28.0 (25-30); 29.6 (28.6-31.2); 20.7 (20.0-21.3); 6.5 (6.1-7.1); 16.3 (15.7-17.0); 12.0 (10.9-13.2); 7.0 (6.5-7.6); 15.3 (14.4-16.5); 7.6 (7.4-7.9); and 13.3 (12.6-14.2).

These gophers have grayish dorsums and sides with varying expression of a bright pigment. The bright pigment, between Ochraceous-Tawny and Sayal-Brown, is conspicuous in two males and noticeable in one male and one female, these individuals being less overlaid with gray and resembling *T. b. hueyi* from the Rincon Mountains, Pima County, in pelage color. The remaining five males and three females of *T. b. carri* are not as bright as *T. b. hueyi* and not as dark as *T. b. catalinae* from the Santa Catalina Mountains, Pima County.

Comparisons:—In comparison with *T. b. proximus*, the race of *T. bottae* inhabiting the middle elevations of the Huachucas and Santa Ritas, *T. b. carri* differs in: braincase less inflated; skull less rounded, more flattened; and pelage color less variable. *T. b. carri* differs from *T. b. hueyi* in the following features: zygomatic arches not curved; auditory bullae inflation more variable, both dorsoventral and lateral in *carri*, tending to be lateral in *hueyi*; and in most specimens, pelage not as bright. There is also an indication of sexual dimorphism in pelage color and skull curvature in *hueyi*, which is lacking in *carri*: the bright pigment in *hueyi* tends to be less conspicuous on the sides of the females and the skulls of male *hueyi* tend to have a greater curvature than those of the females. From *T. b. catalinae*, *carri* differs in: zygomatic arches not curved; auditory bullae inflation more variable; and brighter pelage.

Remarks:—This subspecies is known only from the type locality. See Hoffmeister and Goodpaster (1954:96-98) for notes on habitat and habits and for a photograph of the trapping locality.

Specimens examined:—Total, 12: Cochise County, Arizona; Huachuca Mountains, northwest slope, Carr Peak, 8,400 feet (UI).

Study of pocket gophers from southeastern Arizona revealed another population sufficiently distinct to warrant subspecific recognition. This race of *T. bottae* is named and characterized as follows.

Thomomys bottae caneloensis, new subspecies

Holotype:—Male, skin and skull, no. 51788, University of Kansas, Museum of Natural History, Lawrence, Kansas; Huachuca Mountains, west foothills, Canelo, 10 miles south of Elgin, 5,100 feet, Santa Cruz County, Arizona; collected by G. H. Heinrich, original number 5551.

Allotype:—Female, skin and skull, no. 51786, University of Kansas, Museum of Natural History, Lawrence, Kansas; Huachuca Mountains, west foothills, Canelo, 10 miles south of Elgin, 5,100 feet, Santa Cruz County, Arizona; collected by G. H. Heinrich, original number 5549.

Description:—A large subspecies for the study area. Study material consisted of five males and seven females. The holotype measures as follows: total length, 228; tail, 68; hindfoot, 30; basilar length, 37.0; zygomatic breadth, 26.6; least interorbital constriction, 6.5; mastoidal breadth, 21.3; length of nasals, 13.5; breadth of rostrum, 8.9; length of rostrum, 16.5; alveolar length of maxillary toothrow, 7.4; and palato-frontal depth, 15.7. The males, including the holotype, give average, minimum, and maximum measurements as follows: total length, 224 (208-233); tail, 65 (60-68); hindfoot, 30 (30-31); basilar length, 36.1 (32.8-38.2); and zygomatic breadth, 26.5 (23.3-28.7). The allotype measures as follows: total length, 198; tail, 55; hindfoot, 27; basilar length, 32.6; zygomatic breadth, 24.0; least interorbital constriction, 6.7; mastoidal breadth, 19.1; length of nasals, 11.9; breadth of rostrum, 7.8; length of rostrum, 15.3; alveolar length of maxillary toothrow, 7.6; and palato-frontal depth, 13.5. The females, including the allotype, give average, minimum, and maximum measurements as follows: total length, 208 (198-214); tail, 63 (48-76); hindfoot, 28 (26-30); basilar length, 32.8 (30.8-34.4); and zygomatic breadth, 23.5 (22.2-24.7). The skulls are large and massive, with spreading zygomatic arches.

In pelage color, *T. b. caneloensis* most resembles *T. b. proximus* from Ramsay Canyon, 5,500 and 5,700 feet, Huachuca Mountains. The expressed pigment on the back is closest to Sayal Brown; the sides are between Clay Color and Cinnamon. The dorsum has varying amounts of dark coloration, the dark colors being more evident in worn pelage than in fresh pelage. One specimen (KU no. 51781) is unusual in having a posteriorly widening, deep black, median dorsal stripe.

Comparisons.—From *T. b. proximus, T. b. caneloensis* differs in: larger skull size; heavier and more spreading zygomatic arches; less-inflated but larger braincase; and wider rostrum. From *T. b. modicus, caneloensis* differs in: less-inflated braincase; and darker pelage color. From *T. b. alienus, caneloensis* differs in: larger braincase; and darker pelage color.

Remarks:—This form is known only from the type locality. Gophers referable to *caneloensis* were obtained in deep soil in a grassland-oak swale.

Specimens examined.—Total, 12: Santa Cruz County, Arizona; Huachuca Mountains, west foothills, Canelo, 10 miles south of Elgin, 5,100 feet (KU).

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THE OSTRACOD GENUS *POTAMOCYPRIS* WITH THE DESCRIPTION OF A NEW SPECIES[1]

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Brady (1870) established the genus *Potamocypris* and designated *Potamocypris fulva* (= *Bairdia fulva* Brady 1868) the type species. The genus includes cyprid ostracods having the following characteristics: Valves compressed; right valve projects beyond the left dorsally; valves usually hairy. Natatory setae of second antennae well developed, frequently extending beyond the tips of the terminal claws; ultimate podomere of maxillary palp short, broadened distally and provided with a short claw-like seta. The respiratory plate of the first thoracic leg with a maximum of two setae.

Members of the genus have been found in Europe, Asia, Africa, South America, and North America. Seven of the nineteen species recorded in this paper have been reported from North America. When possible the length, height, and color of the valves and the geographical distribution have been recorded for a species.

SPECIES OF POTAMOCYPRIS

P. almasyi Daday 1904
Size: Length of female 0.58-0.61 mm; height 0.34 mm. Males unknown.
Color: Grass green.
Distribution: Turkestan.

P. arcuata (Sars 1903) Müller 1912
Distribution: China

P. comosa Furtos 1933
Size: Length of female 0.68 mm; height 0.37 mm. Length of male 0.55 mm; height 0.29 mm.
Color: Light green with two conspicuous, bright green dorso-lateral stripes.
Distribution: North America (Ohio).

P. dentatomarginata Daday 1902
Distribution: Patagonia.

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[1] The author acknowledges the assistance of Mrs. Corinne A. Ferguson who prepared specimens for study, and of Miss Alice Boatright, Staff Artist, Department of Zoology, University of Illinois, who prepared the drawing.

P. elegantula Furtos 1933
Size: Length of female 0.55 mm; height 0.38 mm. Males unknown.
Color: Light green with two dark-green dorso-lateral stripes.
Distribution: North America (Ohio).

P. fulva Brady 1870 (= Bairdia fulva Brady 1868)
Size: Length of female 0.70-0.72 mm. Males unknown.
Color: Greenish-yellow.
Distribution: Europe.

P. hyboforma Dobbin 1941
Size: Length of female 0.70 mm. Males unknown.
Color: Not recorded.
Distribution: North America (State of Washington; Idaho).

P. illinoisensis Hoff 1943a
Size: Length of female 0.55-0.56 mm; height 0.30-0.32 mm. Length of male 0.54 mm; height 0.30 mm.
Color: Green.
Distribution: North America (Illinois).

P. islandgrandensis Hoff 1943b
Size: Length of female 0.58-0.63 mm; height 0.32-0.38 mm. Length of male 0.54-0.58 mm; height 0.29-0.35 mm.
Color: Dusky greenish-brown.
Distribution: North America (Louisiana).

P. montevidea (Vávra 1898) Daday 1900
Size: Length of female 0.60 mm. Males unknown.
Color: Not recorded.
Distribution: Uruguay.

P. pallida Alm 1914
Size: Length of female 0.71 mm; height 0.37 mm. Males unknown.
Color: Green with clear area in ocular region.
Distribution: Sweden; North America (Ohio).

P. reniformis (Brady 1907) Müller 1912
Size: Length of female 0.50 mm. Males unknown.
Color: Not recorded.
Distribution: Africa.

P. similis Müller 1912
Size: Length of female 0.55 mm. Males unknown.
Color: Yellowish-white with two dark patches in dorsal region.
Distribution: Switzerland.

P. smaragdina (Vávra 1891) Daday 1900
Size: Length of female 0.56-0.66 mm; height 0.35-0.38 mm. Length of male 0.52-0.61 mm; height 0.28-0.32 mm.
Color: Yellowish-green; eggs orange-red.
Distribution: Bohemia; Europe; North America.

P. unicaudata Schäfer 1943
Size: Length of female 0.81 mm; height 0.46 mm. Males unknown.
Color: Bright grayish-green.
Distribution: Europe.

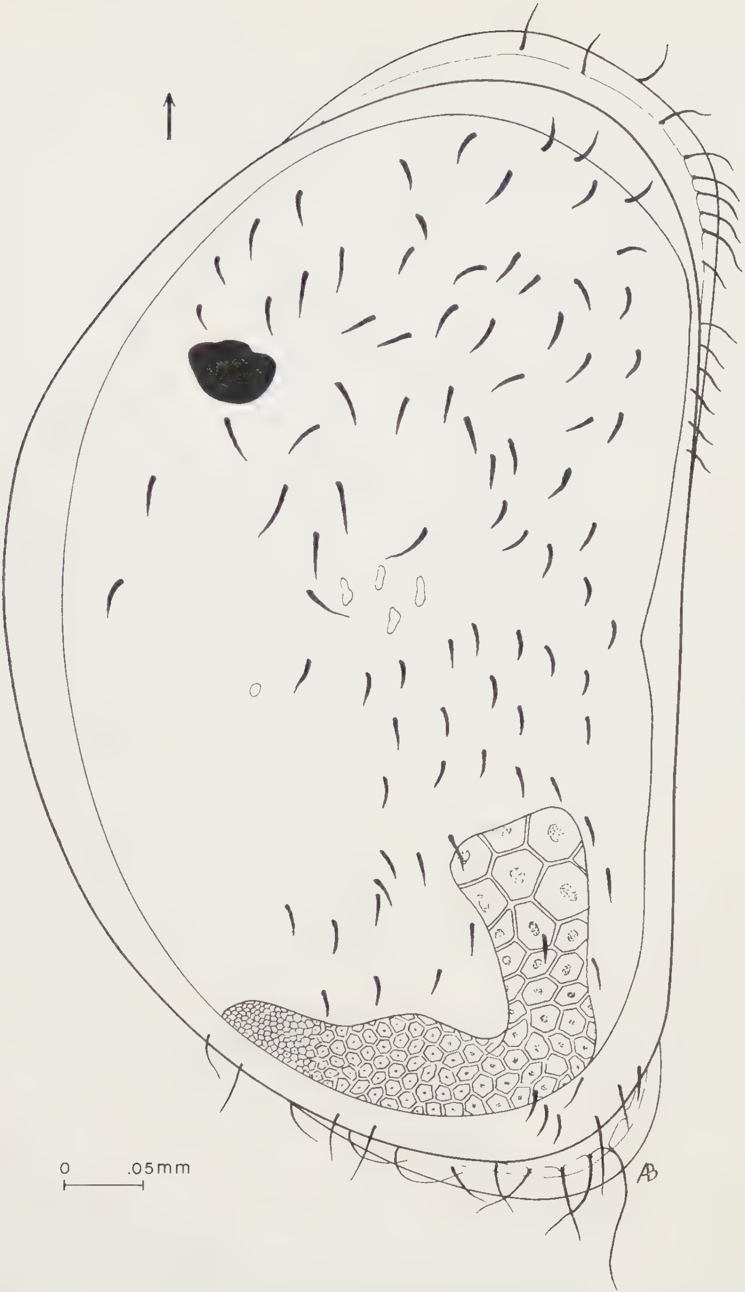

Fig. 1. *Potamocypris saskatchewanensis* n. sp.—Lateral view of the right valve with eye and ovary conspicuous. The drawing was made from a specimen stained in a 1% alcoholic solution of eosin Y and mounted in Canada balsam.

P. variegata (Brady and Norman 1889) Daday 1900
Size: Length of female 0.51-0.56 mm. Males unknown.
Color: Yellow with black bands.
Distribution: Europe.
P. villosa (Jurine 1820) Müller 1912
Size: Length of female 0.68-0.75 mm. Males unknown.
Color: Green.
Distribution: Europe; Asia.
P. wolfi Brehm 1920
P. zschokkei (Kaufman 1900) Müller 1912
Size: Length of female 0.77 mm. Males unknown.
Color: Bright green.
Distribution: Europe.

Potamocypris saskatchewanensis n. sp.

Fig. 1

Specific characters.—Female. Eye prominent. Natatory setae of second antennae reaching considerably beyond the tips of the end-claws. Valves compressed; length 0.75-0.81 mm; greatest height 0.42-044 mm; anterior and posterior ends broadly rounded, the posterior border sloping from dorsal margin to an acute angle ventrally; dorsal margin evenly arched; ventral margin almost straight; submarginal line prominent anteriorly and posteriorly. The surfaces of the valves are armed with strong spines; antero-ventral and postero-ventral margins with heavy setae; right valve with flanges at posterior and anterior ends. The shell is green, with a concentration of pigment in the ocular region.

Males.—Unknown.

Type locality.—P. saskatchewanensis n. sp. was collected by Dr. Richard W. Coleman on August 14, 1957 from a pool located along Highway No. 54 about 4.7 miles south of Regina Beach, Saskatchewan, Canada. *Cypridopsis vidua* (Müller 1776) and *Cypria ophthalmica* (Jurine 1820) were present in collections containing *P. saskatchewanensis* n. sp.

Type specimens.—A stained microscopic mount of the holotype female, USNM Catalogue No. 102574, and four female paratypes, USNM Catalogue No. 102575, are deposited in the United States National Museum. Paratypes (females) are retained in the author's collection.

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PROCEEDINGS
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THREE NEW SUBSPECIES OF THE LIZARD *LEIOCEPHALUS MACROPUS* COPE FROM CUBA

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Cope (1862), Gunlach (1880), Barbour (1914, 1937), Stejneger (1917), Barbour and Ramsden (1919), Cochran (1934), Alayo (1951, 1955), and Hardy (1958a, 1958b) gave locality records of *Leiocephalus macropus* which confined this species to the province of Oriente. Specimens have, however, been taken in the provinces of Camagüey, Las Villas, and Pinar del Río by Dr. Albert Schwartz and associates, John R. Feick, William H. Gehrmann, Armando García, and myself, while making herpetological collections in Cuba during the summers of 1957 and 1958 under the sponsorship of a National Science Foundation grant. It was considered possible that all or some of this freshly collected material might represent populations which differ from *L. macropus* as known from Oriente, and study of these lizards was initiated.

Stejnger (*op. cit.:* 275) gave the following description of a specimen (USNM 26769) collected at Santiago de Cuba, Oriente: "Upper side vinaceus cinnamon with a coppery gloss; head more cinnamon; tail with blackish crossbars narrowly edged with white posteriorly; from nostrils through eye along sides of neck and body to above and behind insertion of hind leg a broad blackish-brown band narrowly edged with pale above and below; upper labials, suboculars, and lower temporals to ear white; below whitish; throat and fore neck with numerous gray dots; lower labials dusky."

Comparison of USNM 26769 with the other Oriente specimens shows that this description is fairly accurate, if the length of time in preservation is considered. Although several of the Oriente specimens do not have the dotted throat or the lateral band quite so blackish-brown as Stejneger's specimen; this may be due to fading brought on by the preservation.

I have examined fifty-three specimens of *L. macropus* as follows: Oriente, 37; Camagüey, 5; Las Villas, 1; Pinar del Río, 9; Isla de Pinos, 1. I wish to thank the following for allowing me to examine the specimens of this species in their care: Dr. Doris M. Cochran, United States National Museum (USNM), Mr. Charles M. Bogert, American Museum of Natural History (AMNH), Dr. Norman E. Hartweg, Museum of Zoology, University of Michigan (UMMZ), Dr. Ernest E. Williams, Museum of Comparative Zoology (MCZ), Dr. Carlos Guillermo Aguayo y de Castro, and Dr. Isabel Pérez Farfante, Museo Poey (MP), and Sr. Miguel L. Jaume García, Museo y Biblioteca de Zoología de La Habana (MBZH). Dr. Albert Schwartz has kindly allowed me to work over his material of this species, which has been deposited in the American Museum of Natural History, and the use of his field notes as well. The drawings are the work of Ronald F. Klinikowski, and he also deserves my thanks for his assistance. Both Mr. Klinikowski and myself have an undergraduate National Science Foundation grant which has in part supported the present research.

The usual scale counts have been made on all specimens of *L. macropus;* these counts include number of median head scales, number of prefrontals, number of frontoparietals, number of temporals, dorsal scales in occiput-vent and occiput-axilla distance, number of loreals, number of postmentals, subdigital carinate scales of fourth toe, and number of scales on one half body at midbody. Table I reveals that apparently none of the non-Oriente populations differs in scalation from those from extreme eastern Cuba. Although there is no noticable difference in the scalation, I feel, after comparison of the Camagüey, the Las Villas, and the Pinar del Río specimens with Stejneger's color description and specimens from Oriente, that the three population represent three new subspecies, the first of which may be known as

Leiocephalus macropus hoplites, new subspecies

Type: AMNH 78020, collected at 12 miles east of Morón, Loma de Cunagua, Camagüey Province, Cuba, by John R. Feick on August 6, 1957. Field number 3706.

Paratypes: AMNH 78016-19, with same data as type, except collected by W. H. Gehrmann and A. Schwartz.

Diagnosis: A subspecies of *L. macropus* distinguished by a distinct black striped throat pattern on a grayish-yellow background. The throat pattern consists of two black paramedian stripes, bordered anteriorly by a black stripe on each side which extends posteriorly in the direction of the axilla. Equidistant between the paramedian stripe and the diagonal stripe is a shorter black stripe (see figure 1). This race is also characterised by a L shaped white bar above the forelimb insertion (see figure 2).

Distribution: known only from type locality.

Description of type: An adult male with the following measurements (all measurements in millimeters): snout-vent length 78; tail 68 (regenerated); hindleg 63; snout-ear 19.5; head width 15. Scalation: median head scales 4; prefrontals 3; frontoparietals 5; supraoculars 6/6; loreals 7; temporals 16; auricular scales 3/3; postmentals 2; dorsals in occiput-vent distance 61; dorsals in occiput-axilla distance 23; scales around one half body at midbody 39; vertical rows of scales in each tail whorl 3; subdigital carinate scales of fourth toe 27/28; prefrontal and frontoparietal rows complete; parietals in contact; supraorbital semicircles incomplete; frontonasals not in contact.

The two outstanding characteristics of *L. m. hoplites* are the striped throat pattern and the markings above the forelimbs. The black striped throat pattern is on a grayish-yellow background and consists of two black paramedian stripes bordered anteriorly by a black stripe on each side which extends posteriolaterally in the direction of the axilla; equidistant between the paramedian and the diagonal stripe is a short black stripe. The stripes are bounded at the base of the throat by a group of small broken stripes on a bronze background which extends slightly onto the chest (see figure 1). The markings above the forelimb insertion are composed of a vertical white bar confluent ventrally with a horizontal white bar (equal to the length of the vertical white bar) which extends anteriorly and slightly dorsally. Anterior to the vertical white bar is a large black area which is dorsal to the horizontal white bar. The large black area is bordered anteriorly by a vertical row of white spots which are just dorsal to the end of the horizontal white bar; anterior to the row of white spots is a small black area. Posterior to the vertical white bar, there is a group of black spots on an area unicolor with the side (see figure 2).

The color of *L. m. hoplites* in life was quite striking. The surface of the head was dark brown with the side of the head and the neck grayish to black. All face and head marking were white, except that the eyelids were yellow and the postmentals pink. The dorsum of the body was bronzy tan intermixed with darker brown, in contrast to the pale yellow of the venter and the underside of the limbs. Scattered throughout the venter were green and maroon scales. On the pale tan upper surface of the forelimbs were yellow spots, whereas the dark brown upper surface of the hindlimbs was spotted with tan. The proximal portion (unregenerate) of the tail was almost a pale violet dorally and laterally, whereas the underside was pink with pale greenish scales.

The color of *L. m. hoplites* after preservation is dull. The surface of the head is gray with the side of the head and the neck a dark grayish-brown. The loreals and the labials are a light brown. Intermixed on the dorsum are gray and bronze which continue down the sides and become a lighter gray until reaching the faded white of the venter. Extending onto the venter from the sides but not reaching the midline are pale blue rows of scales. The underside of the limbs is the same color as the venter, but the upper surface of the forelimbs is gray with black spots in contrast to the brownish-gray upper surface of the hindlimbs with pale blue spots. The background of the throat pattern has become a darker gray with a few white spots scattered throughout. The upper and lateral surfaces of the tail are a dark gray except for the light brown regenerated section. The venter of the tail is a lighter gray which becomes almost white on the regenerated section. A black nuchal

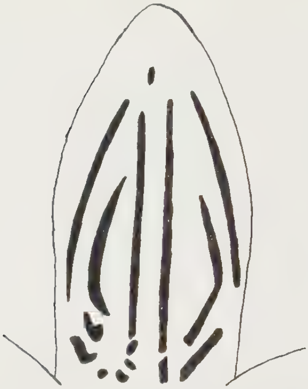

Fig. 1. *Leiocephalus m. hoplites,* throat pattern, type (AMNH 78020), snout-vent length 78 mm.

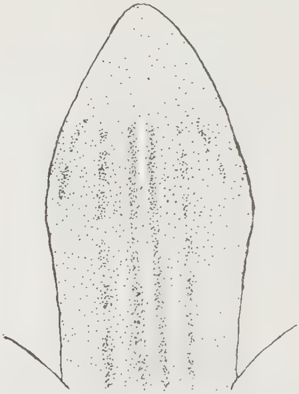

Fig. 3. *Leiocephalus m. macropus,* throat pattern, (USNM 59167), snout-vent length 73 mm.

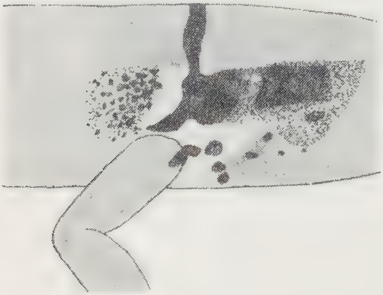

Fig. 2. *Leiocephalus m. hoplites,* shoulder pattern, type (AMNH 78020).

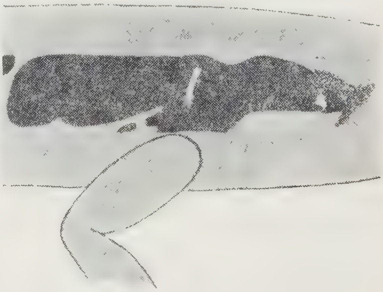

Fig. 4. *Leiocephalus m. macropus,* shoulder pattern, (USNM 59167).

bar, confluent with the large black area of the shoulder marking, is present on the dorsum above the forelimb insertion; on the dorsum above the hindlimb insertion are two short black bars which do not reach the dorsal ridge.

The four paratypes (AMNH 78016-19) are females with the following measurements respectively: snout-vent 65, 62, 60, 64; tail 94, –, 110, 92; head width 12.8, 13.1, 11.6, 12.7; snout-ear 16.0, 15.9, 14.7, 16.7; hindleg 53, 55, 46, 54. Scalation: median head scales 4, 4, 4, 4; prefrontals 3, 3, 3, 3; frontoparietals 5, 5, — 4; supraoculars 7/7, —/5, 6/6, 6/6; loreals 6, 8, 7, 8; temporals 15, 13, 13, 12; auricular scales 3/1, 4/4, 3/4, 4/3; postmentals 2, 1, 1, 2; dorsals in occiput-vent distance 56, –, –, 56; dorsals in occiput-axilla distance 26, 19, –, 21; scales around one half body at midbody 38, 31, –, 35; vertical rows of scales in tail whorls –, 3, 3, 3; subdigital carinate scales of fourth toe 28/26, –/27,

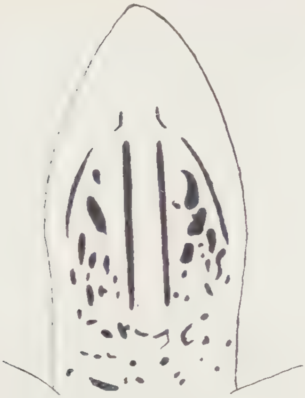

Fig. 5. *Leiocephalus m. hyacinthurus,* throat pattern, type (AMNH 78015), snout-vent length 88 mm.

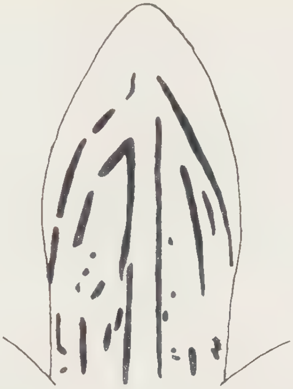

Fig. 7. *Leiocephalus m. koopmani,* throat pattern, paratype (AMNH 81188), snout-vent length 87 mm.

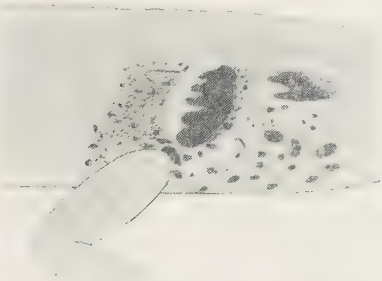

Fig. 6. *Leiocephalus m. hyacinthurus,* shoulder pattern, type (AMNH) 78015).

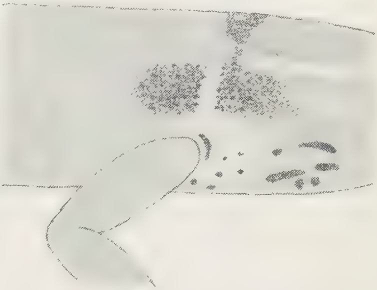

Fig. 8. *Leiocephalus m. koopmani,* shoulder pattern, paratype (AMNH 81188).

26/–, 28/28. All specimens, on which determinable, have prefrontals and frontoparietals rows complete, parietals in contact, supraorbital semicircles incomplete, and frontonasals not in contact.

The black paramedian stripe of the throat pattern is entire in all the paratypes, but the diagonal stripe and the stripe between the paramedian stripe and diagonal stripe are broken in some specimens. The background of the throat pattern varies from darker to lighter than that of the type. The row of vertical white spots anterior to the large black area of the shoulder marking described for the type is lacking in all paratypes, although this area is lighter in color than that anterior to it. In place of the small black area of the shoulder marking there is a dark brown area which extends to the posterior corner of the eye; this dark brown area is also present in the type, but in this single specimen it extends from the anterior edge of the small black area to the posterior corner of the eye. In the paratypes the dorsum is much darker than in the type, and the nuchal black bars of the dorsum are not confluent with the large black area of the shoulder markings. The sacral black bars are identical. The tails possesses dark whorls which are not evident in the type. The forelimbs have black spots, and the hindlimbs have either light spots or none.

Comparison: In contrast to the definite black throat stripes of *hoplites,* males of the race *macropus* have faint gray paramedian stripes with no diagonal stripe, and also lack a stripe just lateral to the paramedian stripe; instead this area is covered by short gray longitudinal stripes (see figure 4). Also in some individuals the pattern is so light as to be unnoticeable; this may be due to the fading effects of the preservative. The throat patterns of female *macropus* are in general slightly darker, but again the pattern fades out although remaining relatively conspicious as a series of short gray longitudinal stripes. The throat pattern in the males of the race *immaculatus* is absent in the specimens I have examined; the female throat pattern is similar to that of the females of the race *macropus* but is not as dark.

The shoulder markings of *macropus* are extremely variable compared to that of *hoplites.* The markings of *macropus* vary from a large black area with a small vertical thin white bar above the forelimb insertion, to an area slightly darker than the sides with a faint vertical white bar. This bar is not confluent with the horizontal white bar (see figure 4). Also, the horizontal white bar, if present, may extend upon the supralabials, may stop at the posterior end of the labials, or may extend no farther than the anterior edge of the black area. The shoulder markings of *immaculatus* are virtually nonexistent, consisting of a very faint vertical white bar above the forelimb insertion on an area slightly darker than the sides. A few black spots may be scattered anterior and posterior to the bar, but these spots are not present in all specimens. The white bar is absent in some specimens.

The dorsum of preserved *macropus* varies from dark blackish-brown in some specimens to light greenish-brown in others. In preserved *immaculatus* the dorsum is generally greenish-brown, but may be gray with a greenish-brown suffusion. Transverse bands of dark and light scales on the dorsum of the female *macropus* are a typical character of that sex, whereas banding on the dorsum of males is infrequent. The banding continues on the tail whorls, and again is more evident in the females than in the males. Banding in *immaculatus* is completely absent. The nuchal black bar of the race *macropus* is not confluent with the black area of the shoulder region, and is bordered posteriorly, as is also the black sacral bar, by a narrow white bar. In two females and one male *macropus* a caudal black bar is present; and in some specimens of *macropus* the nuchal and the sacral bars are absent. The nuchal and sacral black bars are small or absent in *immaculatus.*

Leiocephalus macropus hyacinthurus, new subspecies

Type.—AMNH 78015, collected at Finca La Pastora, 2 kilometer northwest of Trinidad, Las Villas Province, Cuba, by A. Echevarría, on July 30, 1957. Field number 3391.

Diagnosis.—A subspecies of *L. macropus* distinguished from the other described races by a black striped throat pattern on a purplish background. The throat pattern consists of two black paramedian stripes bordered anteriorly on each side by a black stripe which extends posteriorly in the direction of the ear opening. Between the diagonal stripe and the paramedian stripe is a group of small black stripes (see figure 5). This race also possesses a thin vertical yellow bar above forelimb insertion, and a thicker yellow bar which extends from the forelimb insertion dorsally and anteriorly (see figure 6).

Distribution.—Known only from type locality.

Description of type.—An adult male with the following measurements: snout-vent length 88; tail 108 (regenerated); hindleg 69; snout-ear 21.8; head width 6.7. Scalation: median head scales 4; prefrontals 3; frontoparietals 5; loreals 8; temporals 15; supraoculars 6/6; auricular scales 4/4; postmentals 3; dorsals in occiput-vent distance 54 dorsals in occiput-axilla distance 21; scales around one half body at midbody 36; vertical rows of scales in each tail whorl 3; subdigital carinate scales of fourth toe 30/28. The prefrontal and frontoparietal rows are complete; parietals and frontonasals in contact; supraoribital semicircles incomplete.

The throat pattern is on a purplish background with two black paramedian stripes bordered anteriorly by a black stripe which extends posteriorly in the direction of the ear opening. A group of ununiform short black stripes lies between the paramedian stripe and the diagonal stripe; this group of stripes continues posteriorly onto the chest (see figure 5). The markings above the forelimb insertion consist of a thin vertical yellow bar bordered posteriorly by a group of black spots which are somewhat longitudinally arranged upon an area unicolored with the side. Anterior to the vertical yellow bar is a small triangular shaped black area with a short heavy yellow bar at its ventro-anterior edge.

In life the dorsum was tan with the scales becoming increasingly black posteriorly. Above the hindlimb and extending posteriorly onto the sides of the tail and around the vent as well, the scales were purple. The underside of the chest and the limbs was yellow with some pink on the hindlimbs. The side of the face, auriculars, and the side of the neck were whitish. The throat is purple with a rusty suffusion on the mentals and anterior labials.

After preservation, the dorsum is gray intermixed with bronze. The dorsum of the limbs is tannish-gray with black spots scattered throughout. The throat has lost its purple luster and is now a dark gray which blends into bluish-gray at the base of the throat. The venter is dirty bluish-white and, the underside of the limbs is whitish. The nuchal bar is small and almost absent (possibly due to fading), and the sacral bar is absent. The yellow bars of the shoulder marking are now white, and anterior to the shoulder markings along the sides of the neck are black spots with a small black triangular area above them. Auriculars, lower temporals, and loreals are steel gray in color. The upper temporals are dark brown, and upper and lower labials are dark gray.

Comparison.—The throat pattern of *hyacinthurus* differs from that of *hoplites* in that the diagonal stripe of *hoplites* is heavier and makes a lesser angle with the paramedian stripe than that of *hyacinthurus.* Also *hoplites* has a black stripe between the paramedian and the diagonal stripes; whereas this area in *hyacinthurus* is occupied by a group of small black stripes. The throat pattern of both *macropus and immaculatus* is faint in comparison to that of *hyacinthurus.*

In the shoulder markings of *hoplites* the vertical white bar is thicker; the black area anterior to the vertical bar is larger and is bordered on its anterior edge by a vertical row of white spots which are not present in *hyacinthurus.* None of the shoulder patterns of the variable *macropus* is similar to that of *hyacinthurus,* and the shoulder patterns of *immaculatus* is almost non-existent.

Anterior to the shoulder markings and along the sides of the neck are a few black spots in *hoplites;* these black spots are more numerous in *hyacinthurus,* and are lacking in both *macropus* and *immaculatus.*

Leiocephalus macropus koopmani, new subspecies

Type.—MCZ 55541, collected near the base of Cabo Corrientes, Pinar del Río Province, Cuba, by Karl F. Koopman on July 4, 1956.

Paratypes.—AMNH 78014, collected on the north shore of Ensenada de Corrientes, Pinar del Río Province, Cuba, by A García on July 10, 1957; AMNH 81184-86 and 81188-89, collected on north shore of Ensenada de Corrientes, 40 km. west of Cayuco, Pinar del Río Province, Cuba, by A. Garcia and myself on August 19, 1958; AMNH 88190, collected on north shore of Ensenada de Corrientes, 45 km. west of Cayuco, Pinar del Río Province, Cuba, by A. García.

Diagnosis.—A subspecies of *L. macropus* distinguished by a black striped throat pattern on a yellowish green background. Two black paramedian stripes which may be broken are present. On either side of the paramedian stripes are black stripes of varying length which usually lie parallel to the paramedian stripes (see figure 7). A vertical greenish white bar lies above the forelimb insertion with black spots both anterior and posterior to the bar.

Distribution.—Around Ensenada de Corrientes and the Peninsula de Guanahacabibes.

Description of type.—An adult male with the following measurements: snout-vent 84; tail 94 (regenerated); hindleg 70; snout-ear 19; head width 14.2. Scalation: median head scales 4; prefrontals 3; frontoparietals 4; supraoculars 6/6; loreals 8; temporals 14; auricular scales 5/4; postmentals 2; dorsals in occiput-vent distance 53; dorsals in occiupt-axilla distance 20; scales around one half body at midbody 43;

vertical rows of scales in each tail whorl 3; subdigital carinate scales of fourth toe 28/28; prefrontal and frontoparietal rows complete; parietals in contact; supraorbital semicircles incomplete; frontonasals in contact.

The black striped throat pattern lies on a dark gray background which becomes lighter in color at the base of the throat. The throat pattern consists of two black paramedian stripes bordered at the anterior edge by a short diagonal black stripe on each side. Lateral to the paramedian stripes and posterior to the diagonal stripe this area is covered by black spots and small black stripes (see figure 7).

A vertical gray bar above the forelimb insertion is bordered posteriorly and anteriorly by a group of small black spots on an area slightly lighter than the sides. A thick short gray bar extends anteriorly and laterally from the forelimb insertion (see figure 8). On the dorsum above the forelimb insertion a heavy black nuchal bar is present; the sacral black bar is not conspicuous; since it is smaller and is broken into two parts by the dorsal ridge.

The dorsum is dark gray, suffused with black; the dorsum of the unregenerated section of the tail is grayish-green and the dorsum of the regenerated tail is greenish-brown. The dorsum of the limbs is brownish-gray with black scales scattered throughout. The venter is grayish-yellow with the venter of the limbs a little brighter. The sides are a lighter gray than the dorsum and are spotted; these spots are black near the dorsum and become brown as they near the venter.

A dark brown band extends posteriorly from the upper temporals almost to the shoulder pattern. The lower temporals are gray, and this color extends onto the supralabials. The chin is a whitish-gray.

Variation of the paratypes.—The four males (AMNH 78014, 81185-86, 81188) are about one third larger than the females (AMNH 81184, 81189-90). The variation in scale characters is insignificant (Table I).

In life the specimens were a bright grayish-green, almost iridescent. The dorsum was grayish-green and becomes iridescent purplish-green on the sides and the tail. The sides had scattered yellow spots; the dorsum of the hindlimbs had greenish-yellow spots. Posterior to the greenish-yellow throat the venter was an orangish-yellow. The midventral line was slightly green, and the upper eyelids had two bright yellow bars.

The specimens after preservation lose their bright coloration. The dorsa vary from dark grayish-green to tan. The sides are slightly lighter than the dorsum and have black spots. The venters are whitish, but some specimens retain the green midventral line. If prominent, the spots on the hindlimbs are pale blue; black spots on the forelimbs are prevalent in the males but are absent in the females.

The shoulder pattern is almost identical in all specimen, except for a variation in color of the vertical bar. The bar varies from a whitish-green to almost white. On the throat, the paramedian black stripes are broken in several specimens, and the black stripes parallel to the paramedian stripes differ in size and number. The throat backgrounds range from brownish-green to pale grayish-green.

The nuchal black bar and the sacral black bar are present and follow the same pattern as the type. The tips of the unregenerated tails have alternating light and dark brown banding. The band that extends posteriorly from the upper temporals almost to the shoulder pattern varies from dark to light brown. The auricular scales and the lower temporals are dark blue in some specimens and grayish-white in others.

Comparison.—To distinguish *marcropus* and *immaculatus* from *koopmani*, the throat pattern and the shoulder markings are sufficient; neither *macropus* or *immaculatus* has a definite black striped throat pattern as does *koopmani.* The shoulder pattern of *macropus,* in which a thin vertical white bar is present upon a large area of black, will readily distinguish this subspecies from *koopmani;* when *macropus* has a vertical white bar on an area unicolor with the sides no black spots are present, and this again will differentiate it from *koopmani.* The shoulder pattern of *immaculatus* differs from that of *koopmani* by either lacking the vertical white bar, or, if the white bar is present, the black spots are lacking.

The throat pattern of *hoplites* has the definite black diagonal stripe and the black lateral stripe beside the paramedian stripe. The diagonal stripe may be present in *koopmani,* but it is not so definite as in *hoplites.* The lateral stripe is lacking in *koopmani.* The vertical white bar confluent with the horizontal white bar in *hoplites* is not found in *koopmani,* nor is the large black area anterior to the vertical bar present in *koopmani.*

Again, in *hyacinthurus* the diagonal black stripe of the throat pattern is present. The area between the paramedian stripe and diagonal stripe is occupied by black spots in *hyacinthurus;* whereas this area in *koopmani* has short black stripes. The shoulder markings differ in that *hyacinthurus* has a black area anterior to the vartical bar, and *koopmani* has black spots anterior to the vertical bar.

Isla de Pinos specimen.—An uncatalogued specimen of *L. macroups* has been borrowed from the Universidad de la Habana collection. The locality of the specimen is supposedly Punta del Este, Isla de Pinos. I have examined the specimen, and it has the faintly marked throat of the race *macropus;* also the shoulder marking consists of a small vertical white bar surrounded by a large black area, another characteristic of the nominate race. The scale counts fall within the range of *macropus* (Table I).

Collections were made at Punta del Este in the summer of 1958 by Dr. Schwartz and myself; no *L. macropus* were obtained. The habitat is ideal for *L. macropus,* but the area is occupied by *L. cubenis.* As yet *L. macropus* has not bee found anywhere in the same habitats occupied by *L. cubenis* or *L. stictigaster.*

I regard the specimen as having been mislabeled, and it is probably a specimen of *L. m. macropus* from Oriente.

Table I: Data on scalation of five populations of *Leiocephalus macropus.*

	Oriente	Camagüey	Las Villas	Pinar del Río	Isla de Pinos
Number of specimens	13♀, 16♂, 1?	4♀, 1♂	1♂	3♀, 5♂, 1?	1♂
Median head scales	3-7	4	4	4-5	6
Prefrontals	3-4	3	3	3-4	4
Frontoparietals	4-10	4-5	5	4-6	6
Temporals	11.9 (11-16)	13.8 (12-16)	15	13.0 (11 15)	12
Loreals	7.2 (6-8)	9.2 (4-11)	8	8.6 (7-11)	9
Postmentals	3.3 (2-5)	1.5 (1-2)	3	2.4 (2-3)	2
Occiput-vent	61.4 (56-61)	57.6 (56-61)	54	54.6 (53-55)	63
Occiput-axilla	23.0 (19-27)	22.2 (19-26)	21	21.2 (20-22)	24
Axilla-vent	38.0 (25-45)	34.5 (31-39)	33	33.7 (33-34)	39
½ midbody	32.5 (27-41)	35.8 (31-39)	36	33.0 (25-43)	36
Fourth toe	27.3 (24-31)	27.2 (26-28)	29	27.8 (27-29)	27
Subspecies	*macropus*	*hoplites*	*hyacinthurus*	*koopmani*	cf. *macropus*

Specimens examined.—L. m. macropus: Oriente: Cabo Cruz, 2 (USNM 81688-89); Río Puerco, 3 (USNM 81671-72, 81674); Punta Icacos, 4 (USNM 81681-84); Santiago de Cuba, 1 (USNM 26769); Ciudamar, near Santiago de Cuba, 3 (UMMZ 90732); Juraguá, 2 (MBZH 155); San Luis, 1 (USNM 29793); U. S. Naval Base, Guantánamo, 1 (UMMZ 115731); Guantánamo Bay, 6 (USNM 59156-57, 59160-61, 59167-68); Baracoa, 2 (USNM 29795, 29847); Puerto Tánamo, 3 (USNM 80402-04); Banes, 1 (UMMZ 114408).

L. m. immaculatus: Oriente: mouth of Río Magdalena, 1 (USNM 81680); Ocujal, 7 (USNM 138395, 138397, 138411, 138413-14, 138416-17).

L. m. hoplites: Camagüey: 12 mi. E. Morón, Loma de Cunagua, 5 (AMNH 78016-20).

L. m. hyacinthurus: Las Villas: Finca La Pastora, 2 km. NW Trinidad, 1 (AMNH 78015).

L. m. koopmani: Pinar del Río: near the base of Cabo Corrientes, 1 (MCZ 55541); north shore of Ensenada de Corrientes, 1 (AMNH 78014); north shore of Ensenada de Corrientes, 40 km. W. Cayuco, 6 (AMNH 81184-89); north shore of Ensenada de Corrientes, 45 km. W, Cayuco, 1 (AMNH 81190).

L. m. cf. *macropus: Isla de Pinos:* Punta del Este, 1 (MP).

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PROCEEDINGS

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NEW RECORDS OF *ONOMERIS UNDERWOODI* COOK (DIPLOPODA: GLOMERIDA: GLOMERIDAE)

By Nell B. Causey
Fayetteville, Arkansas

Four species representing three genera of the opisthandrous family Glomeridae have been collected in the United States. Three are in the Southern States and the fourth is in California. There probably are others. They are small, dark, easily confused with isopods, and difficult to collect.

KEY TO THE FAMILY GLOMERIDAE IN THE SOUTHERN STATES BASED ON THE MALE

1. The telopodite of the seventeenth legs is composed of four small segments. None of the mesial processes on the telopodite of the gonopods (nineteenth legs) are corrugated .... *Trichomeris sinuata* Loomis

   The telopodite of the seventeenth legs is composed of three small segments. The last two of the mesial processes on the telopodite of the gonopods are finely corrugated .... (*Onomeris*) 2

2. The body surface is without pubescence. There is no mesial process on the first segment of the telopodite; segments two and three have three processes, of which none has a long seta at the apex .... *O. australora* Hoffman

   The body surface is finely pubescent. There are one mesial process on the first segment and three on segments two and three of the telopodite; the two proximal processes each bears a single long seta at its apex .... *O. underwoodi* Cook

Onomeris underwoodi was the first opisthandrous milliped collected in North America. Dr. O. F. Cook (1896) established a new genus and a new family for it and named it after his friend, Prof. L. M. Underwood, with whom he collected more than 100 specimens at Auburn, Lee County, Alabama. His family Onomeridae has been rejected; the differences between *Onomeris* and the European genus *Glomeris* are even less than the differences between some of the other genera of the Glomeridae. Until now, *Onomeris underwoodi* has been known only from Cook's description of the species, for the type specimens have been misplaced in the United States National Museum for many years and no additional collections have been reported. Within the past year I have collected it from the type locality and from four other sites in Alabama, Florida, and Mississippi. It probably occurs in western Georgia, also. No preference for any particular type of woods has been observed, but each collection site is deeply shaded, very humid, and usually well drained. The oniscoid polydesmid *Desmonus earlei* has been collected with it at four sites.

The new collection records for *O. underwoodi* are listed below:

Alabama: *Choctaw Co.* Bladon Springs State Park, under magnolia leaves, 1 ♀; 3 miles northwest of Bladon Springs on highway 6, 2 ♂, 6 ♀, June 19, 1959. *Lee Co.* Chewacla State Park, 5 miles south of Auburn, in humus in dense mixed woods to the right of the bath house, 4 ♂, 2♀, June 14, 1959.

Florida: *Jackson Co.* Florida Caverns State Park, near Marianna, under a layer of moss on a rock at the entrance to the Natural Bridge, 3 ♂, 1 ♀, May 27, 1958.

Mississippi: *Jackson Co.* Ocean Springs, under 3 or 4 inches of fallen bark from a pine stump in marshy ground across Halstead Road from the entrance to the Gulf Coast Research Laboratory, 1 ♂, 6 ♀, mating, 3 larvae, Oct. 1, 1958. The following June I visited this site again; it was dry, and I found no more millipeds.

The body surface of *Onomeris underwoodi* is smooth and shining and covered with a fine pubescence that can easily be seen on dry specimens with a stereomiscroscope; Cook reported that it is ''finely punctate'' and did not mention the pubescence. Specimens in which the color is developed are brown or black-brown with two large, lateral, almost colorless, ovoid areas on segments 2 through 11. The margins of all tergites, most of the head, the antennae, the legs, and the venter are also colorless. The almost colorless first segment is crossed by two horizontal brown lines. Five colorless ocelli are in a single series, and at the posterior end of the series and slightly below it is one black ocellus. Segments 1 and 2 are as in *Trichomeris sinuata* except that on segment 2 there are 4 or 5 striae across the dorsum. Segment 2 through 11 have the posterior margin of the tergites straight. The combined length of segments 10 and 11 is equal to the length of segment 9. The last segment is large and hood-like, with the posterior margin straight in the female and slightly concave in the male. This character makes it possible to distinguish the sexes even when the animals are tightly coiled. The body width is from about 2.1 to 2.7 mm. The length is between about 4.1 and 5 mm. The male is usually about ten per cent smaller than the female.

In the male, the seventeenth legs consist of a lamellar, divided coxosternum and a telopodite composed of three small segments. The eighteenth legs consist of a lamellar, undivided coxosternum and a telopodite composed of four small segments; the thickness of the distal segment is slightly less than that of the others and it is covered with short setae. The nineteenth legs, or gonopods, are much larger than the two preceding pairs; between them is a single, medial sternal process that is rounded at the apex, and adjacent to it is a pair of slightly longer processes that are acute at the apex and setose along the mesial surface. The telopodite of the gonopods is composed of four segments. Each of the first and second segments bears a mesially directed, finger-like process with a single long seta at the apex; the processes are similar except that the first one is about twice as thick and twice as long as the second. The second and third segments bear two mesially directed processes that are finely and inconspicuously corrugated; both are narrowed at the apex, but the proximal one is much broader at the base than the more distal one. The terminal segment of the telopodite is curved mesiad, resembling in shape and in length the processes of the three basal segments; it bears a small, inconspicuous subterminal spine.

Variation. One of the three males from Florida Caverns State Park has been dissected. It differs from all of the others in my collection in that the medial sternal process between the gonopods is slightly broader and the ventral margin is slightly indented in the middle. The indentation is not all as deep as in *O. australora.*

Relationship. The only other species in the genus, *Onomeris australora,* is similar to *O. underwoodi* in size and color pattern, but it is reported (Hoffman, 1950) to differ in the absence of pubescence on the body surface and in the absence of the following details from the telopodite of the gonopods: a mesial process on the first segment, a long seta on the apex of the mesial process of the second segment, and a subterminal spine on the terminal segment. So many differences suggest that the two species may not be congeneric. I have never seen *O. australora.*

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PROCEEDINGS
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A NEW RACE OF NIGHTHAWK FROM THE UPPER MAGDALENA VALLEY OF COLOMBIA

By Alden H. Miller

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Previous studies of the birds of the upper Magdalena Valley of Colombia (Miller, Auk, 64: 351-381, 1947; *ibid.*, 60: 450-457, 1952) have shown that this semi-arid basin is the center of several racial differentiates some of which show pale coloration in one form or another (Miller, Proc. Biol. Soc. Wash., 65: 13-17, 1952). The nighthawks of the species *Chordeiles acutipennis* of this area have been restudied following the assemblage of comparative material that is more adequate than that previously available. This has revealed that there is a pale differentiate of this species also which breeds in the Magdalena basin.

The manifestation of reduced pigmentation in the Magdalena sample of *Chordeiles acutipennis* is almost entirely in the ventral plumage unlike the situation in the races *C. a. aequatorialis* and *C. a. exilis* in the arid belts of Ecuador and Perú, which are pale dorsally. The pallor is variably expressed in the six available specimens of the Magdalena population. It is most consistent in the under tail coverts by reason of the greatly reduced barring of this area, but it also is evident in the reduced width of the dark bars and stripes of the belly and breast. The light ground color of the underparts becomes very pale, particularly on the breast, in certain individuals, notably in two of the four males. One of these two is an adult and the other a first-year bird judged by the criteria for age established by Selander (Condor, 56:58-62, 1954) for this genus. Also in adults the white wing spot equals or exceeds the maximum in *C. a. acutipennis* and the white tail spot of the adult males does likewise. These white areas are so difficult to measure consistently and are individually so variable that statistical treatment and validity of an evident trend cannot be offered. The aggregate effect of the several, non-correlated features of paleness is such as to set off the Magdalena group rather distinctly. No one individual in the sample is without expression of one or more of these attributes which distinguish it from other populations of the species that lie nearest geographically.

The race of the upper Magdalena basin may be known as

Chordeiles acutipennis crissalis new subspecies

Type.—Adult male, no. 120493 Mus. Vert. Zool., taken 5 kilometers north of Villavieja, 1400 feet, Huila, Colombia, on February 27, 1949, by A. H. Miller; weight 40.1 gm.; testis 5 mm. long; original no. 7334.

Diagnosis.—Similar in dark dorsal coloration to *Chordeiles acutipennis acutipennis* of Venezuela, the Guianas, and northern and eastern Colombia, but differs in reduced barring of crissum and under tail coverts, the bars either obsolete or the area immaculate; dark bars of underparts to varying degree narrower; ground color of underparts average paler buff. Size as in *C. a. acutipennis.*

Range.—Tropical Zone of the upper Magdalena Valley in the Department of Huila, Colombia.

Specimens examined.—*C. a. crissalis,* 6: vicinity of Villavieja, Huila, Colombia (3 ad. ♂♂, 1 1st-yr. ♂; 1 ad ♀, 1 1st-yr. ♀). *C. a. acutipennis,* 20: Surinam (1 ♂); Venezuela (5 ♂♂, 5 ♀♀); northern Colombia, Dept. Magdalena and Dept. Norte de Santander (4 ♂♂, 4 ♀♀); southeastern Colombia, Putumayo (1 ♀). *C. a. aequatorialis,* 5: coastal Ecuador (3 ♂♂, 2 ♀♀). *C. a. exilis,* 4: Perú.

Compared with *C. a. aequatorialis, crissalis* is much darker dorsally, especially in the extent of the dusky markings. In ventral coloration there is overlap between these races, although no example of *aequatorialis* closely approaches in palor the two extreme males of *crissalis. Aequatorialis* shows a less extreme tendency than *crissalis* to reduce the barring of the crissum. The race *exilis* is even paler dorsally than *aequatorialis,* but it does not show reduction of the crissal barring.

Chapman (Am. Mus. Novitat. No. 67: 2, 1923) has pointed out that *aequatorialis* is intermediate between *exilis* and *C. a. acutipennis.* Broadly speaking this is true but it is consistently and well set off from both and is not merely a segment of a cline. It is better characterized as an annectent form rather than an intergrade. *Crissalis* is in a sense annectent also but its combination of dark and light features of coloration suggests it is a modification independent of *aequatorialis,* a separate offshoot of *C. a. acutipennis* in which some elements of pigment reduction ventrally have gone farther than in its southern desert relatives. There is no connection of suitable habitat known or likely to be found between the Magdalena basin and coastal Ecuador, as the great Andean mountain mass with its subtropical and temperate forest belts intervenes in southern Colombia and central Ecuador.

In the Magdalena basin, nighthawks were common in the badlands north of Villavieja near our camp in 1949. They also had been found earlier at gravel patches in pastureland near town. The semiarid scrub environment here contrasts strongly with the humid tropical area in the Putumayo district where I recently took a specimen of *C. a. acutipennis* in an opening near the river. The four males taken near Villavieja were obtained in January and February and had active testes, 5 or 6 mm. in length; one female on February 9 was not laying but the other on February 5 had an enlarged yellow ovum, 4 mm. in diameter.

Grateful acknowledgment is made to Dean Amadon of the American

Museum of Natural History and to Herbert Friedmann of the United States National Museum for the opportunity to borrow and examine specimens in their charge. I am also indebted to Alexander Wetmore for drawing to my attention the need for comparing certain features of the nighthawks of the Magdalena basin.

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PROCEEDINGS

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A NEW RED-TAILED HAWK FROM HONDURAS

By Harry C. Oberholser

Identification of hawks in the collection of the late Herbert W. Brandt has revealed a very distinct new subspecies of the Red-tailed Hawk from Honduras.

The Brandt collection is now in the Department of Biological Sciences of the University of Cincinnati, under the jurisdiction of the University of Cincinnati Museum at Cincinnati, Ohio. The curator of the bird collection of this university, Mr. Emerson Kemsies, has graciously given the present writer permission to publish a description of this new hawk.

In view of the remarkable results that Mr. Kemsies has accomplished in creating and building up the ornithological collection of the University of Cincinnati, it seems very appropriate to call this interesting new bird

Buteo jamaicensis kemsiesi, new subspecies

Subspecific characters.—Resembling *Buteo jamaicensis costaricensis* in size, but with upper surface, including the tail, paler; light bars of tertials and secondaries usually with more buff and rufous; lower parts much lighter (more whitish), particularly the abdomen, thighs, and under tail coverts; and upper abdomen much less heavily streaked, sometimes even practically without streaks. Similar to also *Buteo jamaicensis calurus,* but above darker, more blackish (less brownish); below lighter, with fewer and less heavy dark brown streaks on the upper abdomen.

Measurements.—Adult male (1 specimen): extent of wing, 1200 mm; wing (3 specimens), 357-380 (average, 367) mm.; adult female (4 specimens): 381-405 (392.8).

Type.—Adult male, No. 9676, University of Cincinnati; Tegucigalpa, Honduras; April 15, 1937; C. F. Underwood, original number, A 938.

Geographic Distribution.—Honduras; possibly to Chiapas, Mexico.

Remarks.—The 7 examples from Honduras, above measured, were all obtained by the well known collector C. F. Underwood, at the following localities: Tegucigalpa, April 15, 1947; Muin, Intibuca, January 6, 1937; La Laguna, Archaga, June 28, 1937; Las Flores, Archaga, November 10, 1934; La Flor, Archaga, April 3, 1937, May 18, 1937, and June 23, 1935.

There is in the United States National Museum a single Red-tailed Hawk from Teopisca, central Chiapas, Mexico, which looks very much like the race here described. This specimen is even a little more whitish (less buffy) below; but darker above, almost as much so as *Buteo j. costaricensis.* It is here tentatively assigned to *Buteo j. kemsiesi;* but further pertinent material may show it to belong to another and un described subspecies.

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PROCEEDINGS
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THE GENUS *VELOIDEA* GOULD (HEMIPTERA: VELIIDAE)

By Carl J. Drake
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and
David R. Lauck
University of Illinois, Urbana, Illinois[1]

The Genus *Veloidea* Gould (1934) was created to hold *Rhagovelia gigantea* Gould (1928) from Colombia and *Velia vivida* Buchanan-White (1878) from Nicaragua; *Rhagovelia reposita* Drake and Harris (1931) was suppressed therein as a synonym of *vivida* White. Since 1934, only *Veloidea venezolana* Drake and Roze from Venezuela has been described.

Veloidea vivida (Buchanan-White) (fig. 1) is known solely from the type specimen, an apterous female, in the British Museum (Natural History). Mr. Arthur Smith, artist, of the above museum has kindly figured the type for us. This specimen has also been seen by the senior author.

Although closely related and rather similar in general aspect, *Veloidea reposita* (Drake and Harris) differs from *V. vivida* (Buchanan-White) in having the seventh connexival segments on each side prolonged backwards into a sharp spine, instead of truncated (fig. 1). The armature on the inferior side of the hind femora of the female (figs. 1 and 9) is also slightly different in the two species. The male of *vivida* is unknown, also the alate female. On account of these differences, the authors are here restoring *V. reposita* to the specific status.

Genus **Veloidea** Gould

Veloidea Gould, Jr. Kansas Ent. Soc., Vol. 7, p. 57, 1934.

Veloidea is an American genus of water-striders inhabiting the Neotropical Region. The members of this genus are quite large and robust. The structural characteristics are very pronounced, especially the modified tarsal claws of the middle and hind legs (fig. 5) and the male genital segments (figs. 2-4) as shown in the illustrations. The species of other American genera of water-striders furnished with blade-like, tarsal structures (*Euvelia* Drake, *Oiovelia* Drake and Hottes, and *Husseyella* Herring) are much smaller, are less robust, and have very different genital structures.

Veloidea is closely related to the genera *Velia* Latreille (1804) and *Rhagovelia* Mayr (1865). Its members can be separated at once from those of the latter genera by having four, broad, thin, laminate or

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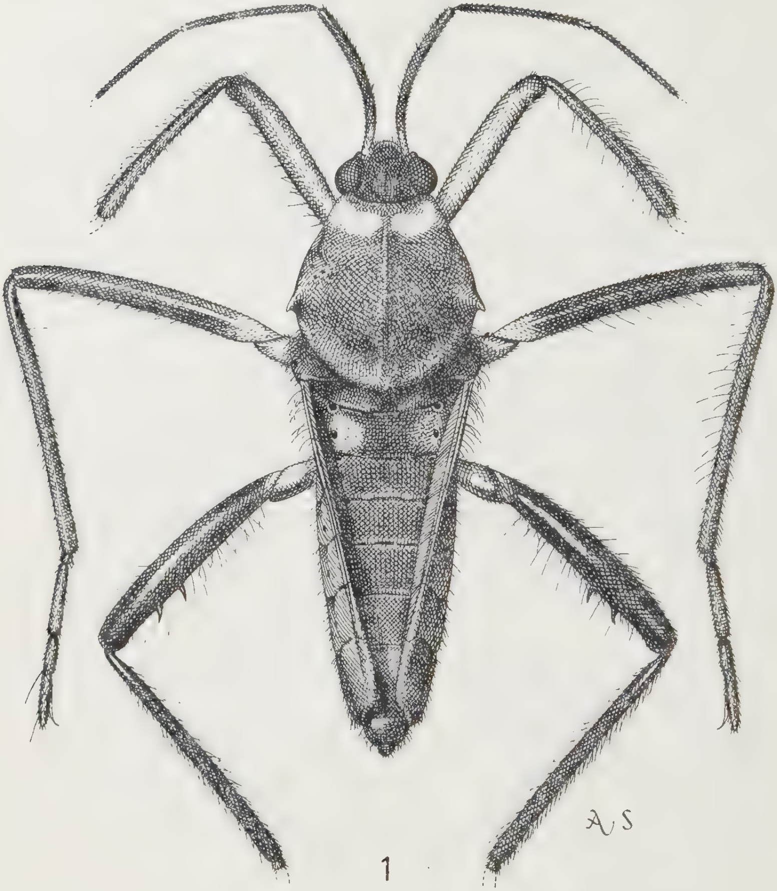
[1] Completed in tenure of a National Science Foundation Fellowship.



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blade-like structure (fig. 5) on the third tarsal segments of the middle and hind pairs of legs, instead of the paired claws.

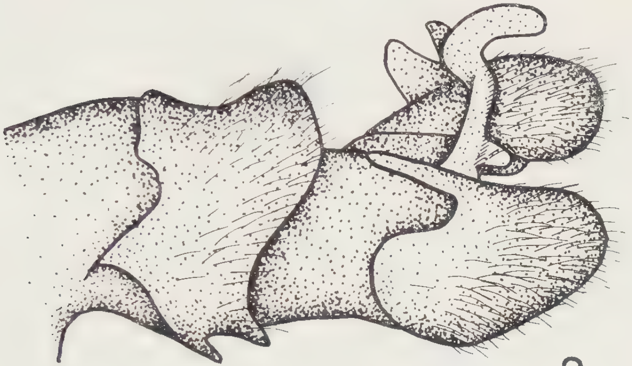
None of the four described species of *Veloidea* is represented in our collections by all of the pterygopolymorphic forms, and the male of one species and the female of another are unknown. On this account, we have prepared a brief compendium with illustrations of each species for specific differentiation.

Veloidea gigantea (Gould) (Figs. 4, 8, 10, and 13)

Rhagovelia gigantea Gould, Ann. Ent. Soc. Amer., Vol. 21, p. 417, 1928; Univ. Kansas Sci. Bull. Vol. 20, p. 46, pl. 5, fig. 1, 1931.

Veloidea gigantea Gould, Jr. Kansas Ent. Soc., Vol. 7, p. 59, 1934

Color stramineous to brown. Length, 8.4 mm.; width 2.2 mm. Pronotum slightly elevated at humeral angles, but not spinosely produced,



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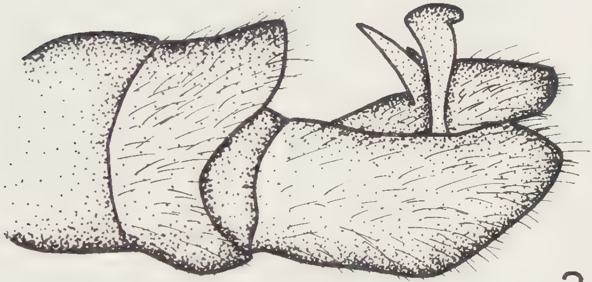

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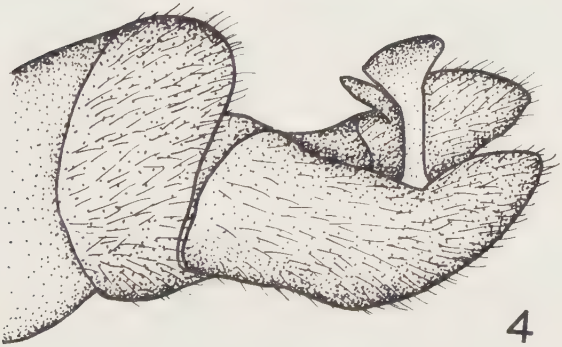

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median length about equal to humeral width. Seventh connexival segment of each side spinosely produced caudally. Legs hairy, hind femora of female two-spined (fig. 10) as in *V. vivida* (Buchanan-White). Genital segments, parameres, and suranal structures as shown in figs. 4, 8, and 13, respectively.

The apterous and macopterous forms of both sexes are known. Specimens are known only from Colombia (Cincinnati and Sierra S. Lorenz).

Veloidea vivida (Buchanan-White) (Fig. 1)

Velia vivida Buchanan-White, Jr. Linn. Soc. London, Vol. 14, p. 486, 1879; Lethierry et Severin, Cat. Gen. Hemiptera-Heteroptera, Vol. 3, p. 58, 1896; Champion, Biol. Centr.-Americana, Rhynchota Hemiptera-Heteroptera, Vol. 2, p. 143, 1898; Kirkaldy and Terre-Bueno, Proc. Ent. Soc. Washington, Vol. 10, p. 205, 1909.

*Rhagovelia vivid*a Hungerford, Ann. Ent. Soc. America, Vol. 22, p. 761, 1929; Gould, Univ. Kansas Sci. Bull., Vol. 20, p. 46, 1931.

Veloidea vivida Gould, Jr. Kansas Ent. Soc., Vol. 7, p. 56, 1934 (in part).

Color blackish brown. Length, 7.5 mm.; width, 2.5 mm. Pronotum spinosely produced upward at humeral angles, median length about equal to humeral width. Seventh connexival segment of each side not produced caudally. Legs hairy; hind female femora two-spined (fig. 1).

Known only from the apterous, female type from Nicaragua in the British Museum (Natural History).

Veloidea reposita (Drake and Harris) (Fig. 2, 5, 6, 9, and 11)

Rhagovelia reposita Drake and Harris, Pan-Pacific Ent., Vol. 8, p. 33, 1931.

Veloidea vivida Gould, Jr. Kansas Ent. Soc., Vol. 7, p. 56, 1934 (in part).

Color blackish brown. Length, 9.1-9.8 mm.; width 2.8-3.0 mm. Pronotum spinosely produced upwards at humeral angles, median length about equal to humeral width. Seventh connexival segment of each side spinosely produced caudally. Legs hairy; hind female femora two- to four-spined, with 1st spine near middle (fig. 9). Genital segments, parameres, and suranal structures as shown in figs. 2, 6, and 11, respectively.

Apterous male and macopterous forms of both sexes have been described. Known only from the type series of many specimens from Guatemala (Chiquimula).

Veloidea venezolana Drake and Roze (Figs. 3, 7, and 12)

Veloidea venezolana Drake and Roze, Bull. Brooklyn Ent. Soc., Vol. 50, p. 106, 1955.

Color stramineous. Length 7.25 mm.; width 2.30 mm. Pronotum extremely coarsely punctate, reduced with median length greater than humeral width, not produced at humeral angles. Seventh connexival segment, parameres, and suranal structures as shown in figs. 3, 7, and 12, respectively.

Known only from the apterous, male holotype from Venezuela (Quinagvina) in the Drake Collection (USNM).

Explanation of Figures

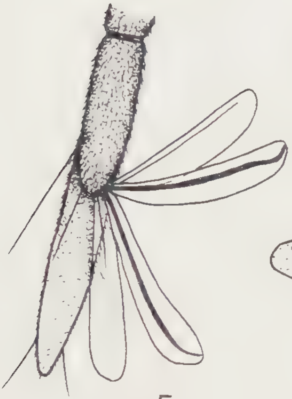
Fig. 1. *Veloidea vivida* (Buchanan-White) (apterous ♀ type).
Fig. 2. *Veloidea reposita* (Drake and Harris), ♂ genital segments.
Fig. 3. *Veloidae venezolana* (Drake and Roze), ♂ genital segment.
Fig. 4. *Veloidea gigantea* (Gould), ♂ genital segment.
Fig. 5. *Veloidea reposita* (Drake and Harris), hind tarsus showing lamillate plates.
Fig. 6. *Veloidea reposita* (Drake and Harris), right ♂ paramere.
Fig. 7. *Veloidea venezolana* Drake and Roze, righ ♂ paramere.
Fig. 8. *Veloidea gigantea* (Gould), right ♂ paramere.
Fig. 9. *Veloidea reposita* (Drake and Harris), right ♀ femur.

Fig. 10. *Veloidea gigantea* (Gould), right ♀ femur.

Fig. 11. *Veloidea reposita* (Drake and Harris), ♂ anal segment showing suranal structures.

Fig. 12. *Veloidea venezolana* (Drake and Roze), ♂ anal segment showing suranal structures.

Fig. 13. *Veloidea gigantea* (Gould), ♂ anal segment showing suranal structures.



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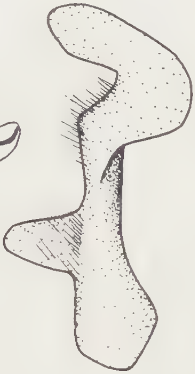

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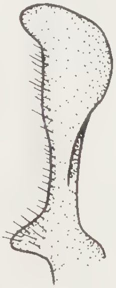

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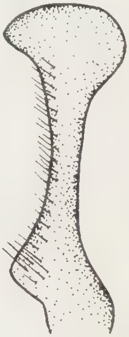

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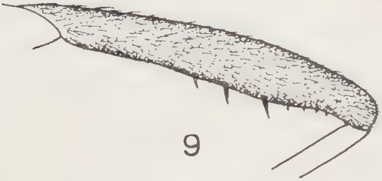

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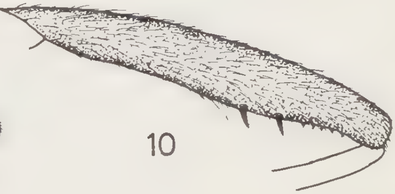

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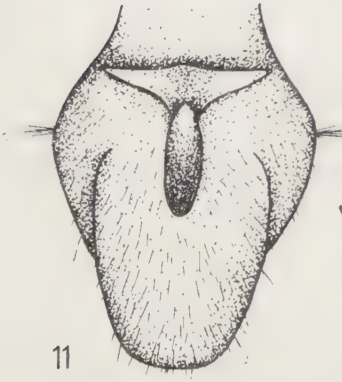

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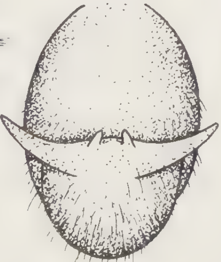

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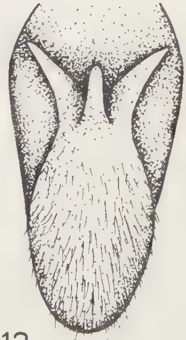

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW SUBSPECIES OF *PEROMYSCUS DIFFICILIS* FROM MEXICO

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Museum of Natural History, University of Illinois

Recently we have studied the variation within the species *Peromyscus difficilis*. A review of the individual and geographic variation throughout the range of this species indicates there occur two groups of populations which in our opinion represent undescribed geographic races. These are as follows:

Peromyscus difficilis petricola new subspecies

Type.—Female, adult, No. 33239, Univ. Kansas Mus. Nat. Hist., from 12 mi. E. San Antonio de las Alazanas, 9000 ft., Coahuila, Mexico, collected by W. Kim Clark, August 2, 1949, original no. 979.

Range.—The Sierra Madre Oriental of southeastern Coahuila and southwestern Tamaulipas and probably northern San Luis Potosí and southern Nuevo León.

Diagnosis.—A race of *Peromyscus difficilis* characterized by long body, relatively short tail with head and body averaging about 95 per cent of tail length (in topotypes), relatively short hind foot (in topotypes), greatly inflated auditory bullae, broad braincase, broad interorbital region, long skull (particularly long nasals, toothrow, and palatine slits), dark color and lacking the ochraeceous of some subspecies.

Comparisons.—From *P. d. difficilis*, *petricola* differs as follows: pelage on dorsum has peppery appearance and slightly less ochraceous; cheeks less buffy; underparts more blackish as a result of shorter white tips on the hairs; body longer, especially relative to tail; hind foot smaller (in topotypes of *petricola*); auditory bullae larger; braincase broader; skull slightly longer, as reflected by longer nasals, palatine slits, diastema, upper toothrow, and postpalatal region.

From *P. nasutus nasutus* from Coahuila, *petricola* differs as follows: color darker, with more blackish, less ochraceous, and a more pronounced peppery appearance; cheeks less buffy; underparts darker; body longer; ear larger; auditory bullae larger; skull longer, especially as *petricola* as a distinct species. Increased inflation of the auditory bullae seems to be the only feature that might set *petricola* aside as a distinct species, and, on the basis of one feature, which is not distinctive in all shown by longer nasals, diastema, palatine slits, postpalatal region, and upper toothrow; braincase broader.

Remarks.—*P. d. petricola* is a dark-colored, large-sized race with greatly inflated auditory bullae. The bullae are larger than in most other populations of *P. difficilis,* and some persons might elect to regard specimens, we regard it as a race of *P. difficilis.*

The large series from Miquihuana, Tamaulipas, is similar to topotypes in color and in large size. In some other features, such as relative length of tail, they differ from these topotypes and possess some of the characteristics of *difficilis.* This difference of the Tamaulipan population suggests that intergradation occurs between *petricola* and *difficilis.*

We have not seen specimens from San Luis Potosí, and the inclusion of any part of this state within the range of *petricola* is tentative.

The name *petricola* is here used as a noun meaning "rock dweller."

Measurements.—Three males, four females, from the type locality: total length, 224.3; length of tail, 115.5; length of hind foot, 23.4; length of ear from notch (dry), 21.4; greatest length of skull, 30.0; basilar length, 22.6; greatest breadth of braincase, 13.9; interorbital constriction, 4.6; length of nasals, 11.5; shelf of bony palate, 4.4; length of palatine slits, 6.4; diastema, 7.7; post palatal length, 10.7; alveolar length of maxillary toothhow, 4.8.

Specimens examined.—Total, 21. COAHUILA: 12 mi. E San Antonio de las Alazanas, 9000 ft., 9 (KU). TAMAULIPAS: Miquihuana, 12 (USBS).

Peromyscus difficilis saxicola new subspecies

Type.—Female, adult, No. 15963, Univ. of Illinois Mus. Nat. Hist., from Cadereyta, 2100 meters, Querétaro, México, collected by Helmuth O. Wagner, July 14, 1948, original no. 839.

Range.—Querétaro and northern half of Hidalgo.

Diagnosis.—A race of *Peromyscus difficilis* characterized by brownish red or ochraceous color, with a reduced overlay of black permitting much of the ochraceous to show; ears more brownish than in other southern subspecies; dorsal tail stripe a mottled brownish; tail long; head and body averages 70.5 to 77 per cent of tail; hind foot not especially long; palate short.

Comparisons.—From *P. d. petricola, saxicola* differs as follows: color more ochraceous with a less peppery effect; underparts lighter; sides of face buffier; tail more brownish, less blackish; ears browner; body shorter and tail longer; auditory bullae less inflated; upper toothrow shorter; skull slightly smaller, including nasals, palate, palatine slits; braincase slightly narrower; interorbital region narrower.

From *P. d. difficilis, saxicola* differs as follows: dorsum more ochraceous; sides of face buffier; ears slightly more brownish; tail longer; hind foot smaller; braincase slightly broader; postpalatal region longer; nasals and palate shorter.

From *P. d. amplus, saxicola* differs as follows: color on dorsum paler;

ears lighter; dorsal tail stripe browner; pectoral spot less evident; tail longer; skull smaller in several features including shorter upper toothrow, nasals, palate, and postpalatal region.

Remarks.—The race *saxicola* is recognizable by its distinctive dull, ochraceous color. It lacks the blackish on the dorsum which adjacent races possess. *P. d. saxicola* approaches *P. d. amplus* in color, but has much less blackish and is a smaller animal with a longer tail.

Specimens from northern Hidalgo (Encarnación) are large for the subspecies and in this respect show intergradation with or at least tend toward *P. d. petricola.* The larger size is not only in external features, but is also reflected by a larger skull, including a long toothrow. Although the specimens are intermediate in some morphological features, in color they are most like *saxicola,* being only slightly darker than topotypes.

The name *saxicola* is here used as a noun meaning "rock dweller."

Measurements.—Four males, five females from the type locality: total length, 232.5; length of tail, 134.7; length of hind foot, 23.7; length of ear from notch (dry), 21.6; greatest length of skull, 29.3; basilar length, 22.4; greatest breadth of braincase, 13.5; interorbital constriction, 4.5; length of nasals, 11.2; shelf of bony palate, 4.2; length of palatine slits, 6.1; diastema, 7.5; postpalatal length, 10.7; alveolar length of maxillary toothrow, 4.5.

Specimens examined.—Total, 62. QUERÉTARO: Cadereyta, 2000 m., 26 (UI). HIDALGO: Encarnación, 7 (USBS); Zimapán, 9 (USBS); 26 km. E Zimapán, 2 (UM); San Agustín (Metzquitilán), 7 (UI); 7 mi. S Puente de Tasquilla, 5700 ft., 5 (MVZ); Ixmiquilpán, 6 (USBS).

We wish to thank Stanley P. Young, U. S. Fish and Wildlife Service, and Sydney Anderson and E. Raymond Hall, Museum of Natural History, University of Kansas, for the loan of material.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE BACULUM IN THE WOOD RAT *NEOTOMA STEPHENSI*

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Museum of Natural History, University of Illinois

The wood rat *Neotoma stephensi* has frequently been confused with similar species, especially *Neotoma lepida, N. albigula,* and *N. mexicana.* Originally described as a species (Goldman, Proc. Biol. Soc. Wash., 18: 32, 1905), it was shortly thereafter designated as a subspecies of *N. lepida* (Goldman, No. Amer. Fauna, 31: 80, 1910). A decade later, the same author again regarded *stephensi* as a distinct species (Goldman, Jour. Mamm., 13: 66, 1932). More recent workers (Hooper, Miscell. Publ. Univ. Mich. Mus. Zool., 51: 35, 1941, and others) have intimated that *stephensi* was conspecific with *lepida.* The taxonomic status and characters of *N. stephensi* have thus been far from clear.

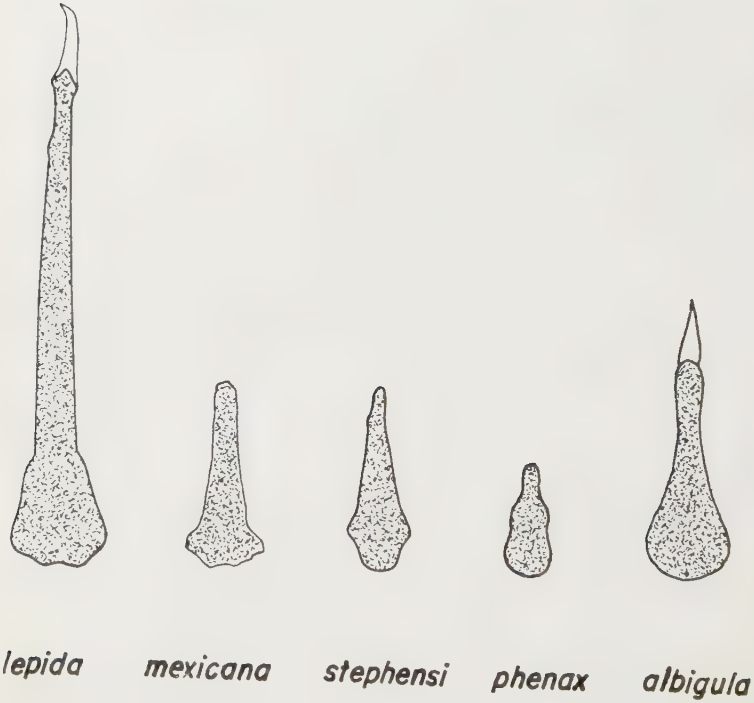
By employing a combination of characters, including color, hairiness of tail, and features of the skull, *N. stephensi* can be distinguished from *N. lepida, N. albigula,* and *N. mexicana.* Recent study of *N. stephensi* shows that its baculum is distinct from that of all other *Neotoma* and not only serves to distinguish this species from *lepida, albigula,* and *mexicana,* but clearly demonstrates its specific distinctness.

The baculum in *stephensi* is exclamation-mark-shaped or wedge-shaped (see fig. 1A). It is smaller than in any species known to occur in the United States. In one fully adult specimen the bone is 5.0 mm. long. In four young adults, the length is 4.1, 3.5, 3.1, and 3.1 mm., respectively. In an immature, the length is 2.4 mm. The bone in the immatures and young adults follows the basic plan of that in adult specimens. One adult has the baculum unusually broad along the proximal half, although still wedge-shaped. Its length is only 2.9 mm.

The baculum in *N. stephensi* is one-fifth the length of that in *lepida* and differs from it markedly in shape. The basal portion is much narrower than in *albigula* and of a different shape than in *mexicana.* It is of about the same size as in *Neotoma* (*Teanopus*) *phenax,* except the sides are not indented and thus not violin-shaped.

If, on the basis of the structure of the baculum alone, one were to estimate the relative taxonomic position of *N. stephensi,* the conclusion would be that it is nearest to *N. mexicana* and *N. phenax.* However, as to which of these it is most closely allied, one should not judge solely on the basis of this evidence.

Fig. 1. Bacula of various species of *Neotoma*, all 4.2 *N. lepida*, UI no. 14499, Mohave Co., Arizona; *mexicana*, after Burt and Barkalow, Jour. Mamm., 23: 293, 1942; *stephensi*, UI no. 18682, Yavapai Co., Arizona; *phenax*, M.V.Z. no. 76182, Sinaloa, Mexico; *albigula*, UI no. 8554, Gila Co., Arizona.



Vol. 72, pp. 173-182 November 4, 1959

PROCEEDINGS
OF THE
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A NEW DIPLOPOD GENUS FROM GUATEMALA, CLOSELY RELATED TO DESMONUS, AND ITS EFFECT ON THE VALIDITY OF THE FAMILIES DESMONIDAE AND CYCLODESMIDAE (POLYDESMIDA: SPHAERIODESMIDAE)

Richard L. Hoffman
Blacksburg, Virginia

The species of Diplopoda are still so poorly known that the unusual is commonplace, particularly in collections from tropical regions, but despite having become somewhat inured to the unexpected I was astonished upon recently discovering abundant material of two milliped species that O. F. Cook had collected in Guatemala and identified as "*Desmonus*, n. sp." These specimens were found hidden in a large jar of Sphaeriodesmids making up part of the huge backlog of unidentified myriapods which has accumulated at the U. S. National Museum for more than 70 years, and were kindly loaned to me for study by Dr. Ralph E. Crabill, Associate Curator in the Division of Insects.

Despite the striking superficial resemblance of the new species to *Desmonus earlei* Cook and its congeners, they differ in so many ways that full generic rank must be admitted as necessary. Aside from their interest from both systematic and zoogeographic points of view, these creatures are also singular in casting light on the origin and significance of the curious segmental cavities previously considered characteristic of *Desmonus* and a few related genera.

Hybocestus, new genus

Type species—*Hybocestus octonodus*, new species (here designated).

Diagnosis—A genus of small, relatively slender sphaeriodesmoids, the length about four times the greatest width, in which the paranota of segment 3 are much the largest, the metatergites of segments 5 to the penultimate are provided with a transverse ridge bearing 6 or 8 conical tubercules, and segments 4 to the penultimate with rudimentary cavities at the base of the paranota. Male gonopods very simple, the coxae with a moderately distinct apophysis, and joined by a narrow transverse sternal remnant; telopodites simple, without accessory processes, the seminal groove running out to the tip of a long flagelliform tibiotarsal portion. Anterior legs of males without knobs or glandular openings, but the femora and postfemora of legs 1-7 conspicuously enlarged, and the coxae of legs 3-6 produced into distinct conical lobes.

Remarks—The obvious similarity of this genus to *Desmonus* is noteworthy, considering the fact that related species and genera occurring between Texas and Guatemala are rather dissimilar in body form. We have two alternative choices to make on the basis of existing knowledge. Either *Hybocestus* and *Desmonus* represent terminal convergence at two extremities of the range of the ancestral stock, or they represent relicts of the original widespread prototype, with loss of ornamentation and other modifications occurring in specialized species evolving more rapidly in the region between them.

The generic name is derived from the Greek *hybos,* hump-backed + *kestos,* a girdle, the latter being especially appropriate in the sense of its extension into the Latin *cestus,* a knobbed contrivance worn on the fists of gladiators.

Species—Two, both from Guatemala.

Hybocestus octonodus, new species

Figures 1-4

Type specimens—Male holotype and female paratypes, U. S. Nat. Mus. Myriapod Type No. 2594, from Coban, Baja Vera Paz, Guatemala, collected in May, 1904, by O. F. Cook.

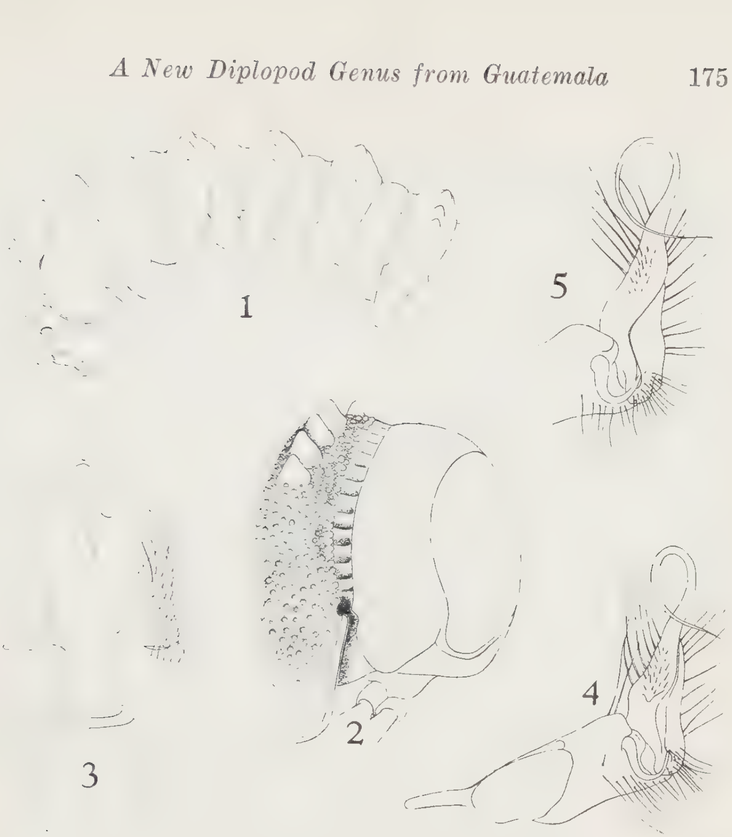
Description—With the characters of the genus. The following notes were made from the holotype after removal of all adherent dirt and debris:

Coloration uniformly testaceous, the tubercules and larger granules grayish white, legs yellowish.

Body slender, composed of head and 19 segments, capable of rolling into a compact flattened sphere, widest near the anterior end, tapering gradually back to 16th segment, thence abruptly to end. Length, ca. 11.0 mm., width, 2.7 mm.

Head fairly large, slightly wider than collum, moderately and evenly convex, the vertex smooth and glabrous but for two pairs of long paramedian vertigial setae, the innermost seta of each pair set distinctly lower on the head than the outer; surface of head below level of antennae becoming densely setose. Genal surfaces continuing the convexity of the frons, not medially swollen to form a subantennal ridge, laterally sloping off to a straight, thin, immarginate edge. Interantennal isthmus slightly broader than length of 1st antennal article but much narrower than length of 2nd; lower part of vertex without a median carina (such as reported by Loomis for several species of *Desmonus*) but with a broad flat elongate area set off by two indistinct grooves which extend dorsad from inner angles of antennal sockets and appear to converge abruptly about the level of the vertigial setae.

Antennae long and slender, extending caudad nearly to caudal margin of 3rd segment, all of the articles setose but most distinctly so distally, where the terminal four are invested with (1) dense, short setae, almost pubescence, (2) numerous more widely spaced and longer setae, and (3) an apical whorl of even longer sensory hairs. Antennae slightly compressed distally, the 6th article largest and longest, somewhat fusiform; 7th small and bluntly conical, with 4 long slender sensory



cones. Outer sides of articles 5 and 6 (perhaps also 7) with small, rounded, apical sensory areas. Lengths of articles in descending order: 6-2-3-5-4-1-7.

Collum subtrapezoidal, twice as wide as long, the anterior and posterior margins nearly transverse but the latter turned forward laterally; anterior corners rounded and depressed somewhat. Surface of collum smooth, with broad, low, faintly convex areas each with a median seta, four across the caudal margin, one on each side along the lateral margin, and two paramedian near the center of the collum.

2nd segment smooth, its paranota slender and enclosing collum, extending cephaloventrad as far as its anterior corners; both margins of the paranota slightly turned up to impart a somewhat flatly concave effect; dorsum of segment with a series of 8 setae along the caudal margin and out onto the paranotal bases.

3rd segment with greatly expanded paranota, these about twice as wide as those following, metatergites of this and all subsequent segments finely but densely granular, the prozonites smooth. Surfaces of these subsegments concordant at a narrow suture line; the 8 transverse setae of the metazonite near the midlength of the subsegment instead of near the caudal margin.

Segments 4 and 5 similar in shape, but former entirely smooth and flat, while the metazonite of the latter is elevated above level of prozonites and carries a median transverse series of 3 distinct high conical tubercules on each side of the middorsal line, and a much smaller tubercule on each side about halfway from the outermost large tubercule to the level of the paranotal bases.

Segments 6-17 subsimilar, the prozonites and metazonites separated by a deep constriction which becomes narrower and deeper on the lower sides, and which is ornamented by a series of subcontiguous ovoid pits. Surface of prozonites smooth and polished, that of metazonites beset with profuse, erect, conical microtubercules which accumulate a coating of dirt and organic debris in the living animals; the transverse dorsal series of large processes increasing in size and acuteness back to the 17th segment where they are at least twice as high as their basal diameter. Paranota relatively small and set low on sides, arching slightly ventrolaterad and then directly ventrad, the ends vertical; those of segments 5 and 6 acutely pointed, from segment 7 on caudad first becoming rounded and then truncate with the anterior corners obtusely-angled, the posterior acutely-angled. Anterior and lateral edges of paranota very thin and smooth, the posterior edge ornamented with a series of 8 to 12 or more denticles which increase in size toward the body. Anterior margins produced gradually cephalad toward the body, culmnating in a blunt lobe or *tragus* (a new term, selected with reference to the similarity to the tragus of the mammalian ear) which almost contacts the adjacent surface of the prozonite across the deeply impressed interzonal groove; the posterior edge also produced caudad at the base into an acute lobe which, when the animal is coiled, overlaps the tragus of the following segment.

Segment 18 reduced in size, its dorsal processes very low but still evident and discrete. Segment 19 small, profusely studded with coarse, boletoid granules, a large paramedian setiferous tubercule on each side near the middle, and provided with 6 long setae along the caudal edge. Basal half of segment nearly vertical, the distal half very slightly flared outward. Profile of 19th segment in ventral aspect slightly acute medially rather than evenly rounded.

Anal valves flat, each with two long medially directed setae, hypoproct large, subtriangular, longer than wide, the sides convex. Median length of hypoproct greater than the line of contact between the anal valves.

Pleural and sternal areas completely glabrous and smooth, the interzonal groove conspicuous and deep except in its course in curving forward in front of the anterior legpair, level of prozonite elevated above that of metasternum. No podosternal development, the legs attached to coxal sockets virtually flush with the sternal surface, the coxae of each pair in contact medially but well-separated from those of the other pair. Stigmata very small, ovoid, not auriculate, on the anterior lateral side of each coxal socket. Length of prozonite at midventral line about 2/3rds that of metazonite.

Legs long and slender, the coxae nearly glabrous but the distal articles moderately setose, especially the tarsus. Joints in descending order of length: 3-6-2-4-5-1. Pregonopodal legs somewhat shorter and heavier than the others, the femora and postfemora of legs 1-7 distinctly enlarged, but not provided with any ventral lobes or glandular openings. Coxae of 2nd legs produced into long slender conical processes extending back between coxae of 3rd pair, the sternite of 2nd legpair pivoted on pleurotergite on each side and freely moveable. Coxae of legs 3-6 produced ventrad into conspicuous subtriangular lobes, those of pairs 3 and 6 separated, of 4 and 5 almost in contact.

Gonopod aperture very large and transverse, occupying most of sternum of 7th segment, the prozonite reduced to a mere narrow vestige about 1/8th the length of the opening, the metazonite reduced to a strip just wide enough to contain the coxal sockets of the 9th legpair, which are widely separated. Aperture not margined except at its lateral ends where the segment is produced into prominent subhemispherical lobes.

Gonopods freely moveable in the aperture, not attached to its edges, the coxae cylindrical and elongate, with a prominent apophysis just above insertion of the solenite, and with several long macrosetae just below it. Coxae connected by a slender but well sclerotized sternite, its apodemes largely fused with the coxae and remaining with them upon separation. Telopodite not definitely resolvable into distinct regions but basally enlarged and with long slender setae near insertion of the solenite, the mesial surface takes the form of a short ridge terminating in an acute basally directed spur, beset with short stiff bristles and bordered by a lateral row of long, slender macrosetae. Telopodite distally drawn out into a long acuminate flagelloid process describing a complete circle or nearly so, without any trace of accessory branches or processes. Prefemur of gonopod without indication of a prefemoral process.

Hybocestus plagiodon, new species

Figure 5

Type specimens—Male holotype and female paratypes, U. S. National Museum Myriapod Type No. 2593, from Tree Aguas, Guatemala, collected on March 30, 1906, by O. F. Cook.

Description—Superficially similar in most structural details and sexual characters to the type species, differing from *octonodus* in the following particulars:

Size considerably larger, the holotype 3.2 mm in width, a large female paratype 15 mm in length and 3.4 mm in width.

Body composed of head and 20 segments instead of only 19. Head considerably less setose on frons and clypeus, the genae with distinct flattened margins. Interantennal isthmus much broader than in *octonodus*, as broad as length of 2nd antennal article; lengths of the articles in descending order: 6-5-2-4-1-7, as opposed to 6-2-3-5-4-1-7.

Surface of collum finely granular instead of smooth. Segment 5 with 3 flattened tubercules on each side, those at the middorsal line in contact basally; the 3rd tubercule outward very small in relation to the paramedian series, halfway from it to the paranotal bases is a 4th, even smaller tubercule which is conspicuous chiefly because it carries a visible seta. Tubercules of segments 7 and 8, and 15 through 18 largest, those of segments 9 through 14 distinctly smaller, and in going caudad on the body, the tubercules tend increasingly to slope caudad (hence the specific name) rather than remaining perpendicular on all segments as in *octonodus.*

Interzonal groove broad and very shallow, provided with oblong pits only far down on sides; metazonites very abruptly elevated from posterior margin of the groove. Posterior edges of paranota with about 15-20 small dentate tubercules, as against 8 to 12 in the other species.

Telson, as seen in profile, sloping evenly to the edge instead of the distal half distinctly flared outward.

Male gonopods very similar to those of the type species, but considerably larger; the femoral ridge less pronounced and the corresponding area somewhat more strongly expanded outward.

Comparative morphology of the lateral cavities

The genus *Desmonus* was originally based in part on the presence of deep circular pits at the anterior base of the paranota, extending from the 3rd to the penultimate segment. In the subsequently described *Desmoniella* (Loomis, 1943) the cavities were found in the proper position but only on segments 4 to 10 inclusive. This discovery alone compelled the recognition of some mutability in the character, and the Mexican genus *Peridysodesmus*, which is similar to *Desmonus* in gonopod structure, apparently lacks the cavities altogether. With *Hybocestus* we gain some insight into the mode of formation of the structures. As already remarked in the preceding description, the anterior edge of the paranota is bowed cephalad in going toward the body and the anterior basal part of each paranotum is thus produced into a projecting subtriangular lobe for which the name *tragus* was suggested. In both species of this genus the tragus extends distinctly cephalad over the interzonal groove, which itself is accentuated at the paranotal base, and virtually meets the adjoining surface of the prozonite. It would require but little further modification to affect a complete junction and fusion of the two areas, thus leaving the interzonal groove bridged over to form a circular tunnel. This in fact is the condition in *Desmonus*, as can be seen from specimens boiled in KOH to clean off the dirt, although here the basal part of the paranota is turned in sufficiently to close off the ventral end of the tunnel.

Do these cavities contain the ozopores? This point has been in doubt since Cook's time, and cannot be resolved at this time with complete assurance. However, specimens of *Hybocestus* have been cleaned with strong caustic, then decalcified in acid, dehydrated through alcohol, and mounted in balsam, and such preparations have been studied under oil immersion without any trace of pores being detected. Doubtless the pores are absent in this genus, and inferentially so in *Desmonus*, although the study of serial sections will be desirable for confirmation.

On the other hand, it is well worth mentioning at this point that ozopores do occur in the genera *Sphaeriodesmus* and *Cyclodesmus*, both stated by Cook (1898) to be poreless. Perhaps the location of the pores, on the reduced and incurved surface of the metazonites, plus their small size, caused them to be overlooked by earlier workers. In the two genera mentioned, the ozopores are located just dorsad to and in front of the base of the paranota in front, normally concealed by the caudal margin of the preceding segments. Such a position for the pore is by no means unusual, however, as it is characteristic of most of the Oriental *Pterodesmidae* where it may even be on the ventral side of the paranotal base!

On the basis of this information, the family ''Cyclodesmidae'' (= *Cyclodesmus*) was credited as having pores in a key to families in the ''Checklist of the Millipeds of North America'' although the statement was pronounced false by a recent reviewer of that work who presumably relied upon old literature rather than personal examination of specimens.

The Status of the Families Desmonidae and Cyclodesmidae

Within recent years the number of species of polydesmoid millipeds related to *Desmonus earlei* has been greatly augmented by a variety of animals many of which depart in one way or another from the original characters attributed to the genus and to its family Desmonidae. Since most workers are still content to follow the old existing classifications in their haste to erect new species, it seems appropriate that this occasion be taken to review the status of the Desmonidae in the light of existing knowledge, even though some of the named genera and species are known only from very meagre descriptions.

The foundations of our knowledge of American denisciform polydesmoids were laid by O. F. Cook in 1898, at which time he recognized five families separated to a considerable extent by the relative sizes of the anterior segments and their paranota. Although Cook's taxonomic perspicuity was far better than average in the recognition of groupings and affinities within the Diplopoda, it must be recalled that in the five families alluded to, he was able to study specimens of but ten species, and some of the families were based exclusively on the characters of single species.

Cook himself remarked that his arrangement and key to families was an artificial one, ''. . . the forms included not composing a natural group . . .,'' but it remained for Brolemann to suggest that the Sphaeriodesmidae, Cyclodesmidae, and Desmonidae were related to the Chelodesmidae, while the affinities of the Oniscodesmidae and Cyrtodesmidae lay instead with the polydesmid families. This system was followed by Pocock in the Biologia Centrali-Americana, but in the latest summary of the Polydesmida, the Count von Attems (1940) combines all denisciform polydesmoids in the single family Oniscodesmidae, admitting, however, two subfamilies on the lines suggested by Brolemann's dichotomy.

The Desmonidae was erected primarily on the basis of ''the possession on each segment of a deep cavity located at the base of the carina in front.'' From the superficially similar genus *Cyclodesmus* (which formed the basis of a family Cyclodesmidae), *Desmonus* was further separated by having the surface of the segments granular-hispid, instead of smooth, even, and polished; and in that the paranota of the 4th segment are larger than those of the 5th instead of subequal as in *Cyclodesmus*. These two genera (and ''families'') were separated by Cook from the related Sphaeriodesmidae solely by relative sizes of the anterior segments and of the antennal articles.

So long as only one or a few species were known for each family, the diagnostic characters used by Cook remained useful and valid. With passing time, however, new forms have been described which virtually demolish the original distinctions, as shall be discussed at this point.

At the time *Desmonus* was described, Cook was puzzled by two enigmatic species which he knew only from the literature, but admitted nonetheless as the types of two genera: *Cylionus* and *Cyphodesmus*. *Cylionus*, which Cook proposed for *Sphaeriodesmus gracilis* of Humbert and Saussure, was placed in the Sphaeriodesmidae but with the admission that most of its characters indicated closer affinity with *Desmonus*. *Cyphodesmus* Peters, based on *Oniscodesmus mexicanus* Saussure, was regarded as related to *Desmonus* although being several times larger than *D. earlei*, and differing in various other ways.

In 1910, Filippo Silvestri very briefly diagnosed and figured two remarkable new genera from eastern Mexico, without allocating them to a particular family. Of them, *Taphrodesmus* was provided with lateral ''pits'' in exactly the position they occur in *Desmonus*, but differed from that genus in lacking transverse rows of tubercules and in having the 4th and 5th segments largest instead of the 3rd. Silvestri's second genus, *Peridysodesmus*, differed from *Desmonus* in lacking lateral pits and transverse rows of tubercules, and in having the 4th segment as large as the 3rd, but the gonopods are basically similar to those characteristic of *D. earlei*.

In 1943, H. F. Loomis erected still another genus, *Desmoniella*, in which the male gonopods are virtually identical with those of *D. earlei*, and in which the lateral pits are present although not on all of the body segments. *Desmoniella*, however, is completely smooth dorsally and the 2nd segment is essentially as large as the 3rd.

Finally, with the description of *Hybocestus*, we are provided with species which, if known only from females, might understandably be regarded as congeneric with *Desmonus earlei*, so great is the general concordance in body form and proportions. Yet the genus departs from *Desmonus* in sexual characters, as well as in the more primitive development of lateral cavities which indicates something of their evolution into the form which characterizes the North American genus.

I think the conclusion to which we are compelled by existing information must be that the characters originally stipulated for the family Desmonidae are at best generic in value, insmuch as they are shared in various combinations (pits, dorsal ornamentation, size of anterior segments, and form of gonopods) by members of seven apparently valid and obviously related genera.

What, then, is the status of the name Desmonidae? On the basis of Cook's original key (1899: 452), *Taphrodesmus* goes into his Sphaeriodesmidae and *Peridysodesmus* into the Cyclodesmidae, yet both are closely related to *Desmonus*. The basic structure of the gonopods, particularly retention of a distinct sternal remnant, is characteristic of all three of Cook's ''families'' here considered, as well as of many primitive genera in chelodesmoid families. *Desmonus* and *Sphaeriodesmus* even share, in addition, virtually the same configuration of the 1st legpair of males, with the femora dorsally arched and provided with a basal tubercule or spur on the ventral side.

Pocock (1909: 117) has already combined the families, remarking in his introduction to the Sphaeriodesmidae, "I include in this family the genera which Cook referred to the Sphaeriodesmidae, Desmonidae, and Cyclodesmidae, because the genera *Sphaeriodesmus* and *Cyclodesmus* appear to be linked to a certain extent by *Cylionus,* and because the essential feature upon which the Desmonidae were separated from the Cyclodesmidae is not known to occur in the one Central-American genus. Cyphodesmus, referred by Cook to the Desmonidae." Pocock tentatively retained Cyclodesmidae as a subfamilial designation, solely, however, on the basis of segmental size and shape, a character which we now know to be subject to much variation even in closely related forms.

Perhaps the single character which might afford a major dichotomy is the relative size and shape of the prozonites. In *Desmonus* and *Hybocestus,* at least, they are not strongly reduced and even ventrally are nearly as long as the metazonites. In *Sphaeriodesmus* and allied genera, the prozonites are quite small even on the dorsal side, and are virtually obliterated on the ventral side. What the relationship of the two subsegments may be in the numerous other genera concerned, I have no direct knowledge, and this matter must await future treatment. *A priori,* however, it does not seem likely that the character will prove to be much more stable than other details of body form. For the present, I can find no justification either in gonopod configuration or external characters for the continued recognition of the names Cyclodesmidae and Desmonidae on either the family or subfamily level, although some groups of genera in the Sphaeriodesmidae may share enough characters in comon to be thought of as desmonid or cyclodesmid.

In its new and more inclusive sense, the family Sphaeriodesmidae comprehends some 16 genera (some of uncertain validity) restricted to America north of Panama. The largest genera tend to inhabit discrete regions, viz., *Sphaeriodesmus* in the Central American highlands, *Desmonus* in southern United States, and *Haplocyclodesmus* in the Greater Antilles.

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Figure 1. *Hybocestus octonodus,* n. sp., lateral aspect of head and first 9 body segments, the distension owing to maceration of the specimen in caustic which has also caused the head to be far more exposed than under normal conditions. Figure 2. The same, an enlarged drawing of a midbody segment seen in a slightly oblique cephalolateral aspect, to show microsculpture of the cleaned surface, and relationships of the paranotal tragus to the interzonal groove. Figure 3. The same, gonopods in cephalic aspect, showing relationship of coxites to the sternite; setae omitted from left gonopod. Figure 4. The same, left gonopod in mesial aspect. Figure 5. *Hybocestus plagiodon,* mesial aspect of left gonopod of holotype. Figures 3, 4, and 5 drawn to the same scale.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

FOUR NEW MAMMALS FROM THE NORTHERN TERRITORY OF AUSTRALIA

By David H. Johnson

United States National Museum

The following new kinds of placental mammals and a new species of the marsupial *Antechinus* described previously in these Proceedings (vol. 67, pp. 77-80, 1954) were discovered in studying the collections made by the American-Australian Scientific Expedition to Arnhem Land of 1948, which was sponsored jointly by the Commonwealth of Australia, the National Geographic Society, and the Smithsonian Institution. A general report on the mammals will be included in the "Records" of the Expedition, which are being published in Australia by the Melbourne University Press.

Capitalized color terms are from Ridgway, "Color Standards and Color Nomenclature," 1912. All measurements are in millimeters.

Order CHIROPTERA

Family HIPPOSIDERIDAE

Hipposideros bicolor gilberti, new subspecies

Type specimen.—U. S. National Museum, No. 284170; male adult, skin and skull; collected November 1, 1948, by D. H. Johnson (field no. 5936).

Type locality.—Oenpelli, East Alligator River, Northern Territory, Australia (lat. 12° 21′ S., long. 133° 04′ E.).

Diagnosis—A small race of *Hipposideros bicolor*, paler in color than previously described eastern races of that species, in size about equal to *cineraceus* of Burma and *anticola* of the Philippine Islands, smaller than *albanensis* of the Cape York Peninsula and *saevus* of the Key Islands.

Description.—Hair bicolored as is characteristic of the species, but terminal darkened part reduced to less than one third of total length; basal part between white and Pale Smoke Gray, terminal part near Drab, but general dorsal color effect much lightened by paler basal color which shows through from all angles; breast and belly colored like back but fur much shorter; throat whitish, terminal darkening of hairs imperceptible. Nose leaves comparatively simple, squarish in outline, lacking secondary leaflets or club-shaped median projections; transverse process divided into four approximately equal cells by three vertical septa. Ears broad, rounded at tips, and with simple outer margins. Skull narrow and pointed; mastoid breadth exceeding zygomatic breadth; upper incisors and canines simple; small upper premolar with its outer edge aligned with outer margin of toothrow.

Measurements of type specimen.—Head and body 45 mm., tail 24, hind foot with claw 8, ear from notch 21, forearm 37, condylobasal length of skull 13.7, length of skull from condyle to canine (as used by Andersen, Ann. & Mag. Nat. Hist., ser. 9, vol. 2, p. 380, 1918) 13.4, zygomatic breadth 8.0, mastoid breadth 8.4, intertemporal constriction 2.1, upper toothrow C-M^3 5.3.

Specimens examined.—A total of seven: the type and three others from Oenpelli (USNM nos. 284167-70), and three including a nursing young from Douglas River, about 100 miles south of Darwin (USNM nos. 237956, 237961, 237964).

Remarks.—The species *Hipposideros bicolor* is represented by numerous subspecies over a wide area in southeastern Asia and the various island groups east to New Guinea. The only race previously recorded from the Australian mainland is the dark-colored *albanensis* of the Cape York Peninsula.

The specimens from Douglas River were collected by Charles M. Hoy in 1920 and have for many years been misidentified as *Hipposideros stenotis,* the only member of the genus previously known from the Northern Territory of Australia. They were mentioned under that name by Tate (Bull. Amer. Mus. Nat. Hist., vol. 78, p. 389, 1941). The small size, bicolored fur, great mastoid breadth, and absence of protuberances on the nose leaves clearly distinguish them from that species and ally them with *Hipposideros bicolor.*

The new subspecies is named in honor of John Gilbert, the English naturalist who in 1840 initiated the study of the mammals of the present Northern Territory by making extensive collections at Port Essington.

Family VESPERTILIONIDAE

Nyctophilus arnhemensis, new species

Type specimen.—U. S. National Museum, No. 28424~~6~~0; male adult, skin and skull, collected August 12, 1948, by D. H. Johnson (field no. 5692).

Type locality.—Rocky Bay, south of Yirrkala, Cape Arnhem Peninsula, Northern Territory, Australia (lat. 12° 16′ S., long. 136° 47′ E.).

Diagnosis.—A small *Nyctophilus* resembling *N. microtis* and *N. geoffroyi* in size; differing from the latter species in having smaller ears, less well developed nose leaves, and broader skull; larger throughout and with much larger ears than *N. walkeri.*

Description.—Color above between Snuff Brown and Tawny-Olive, beneath near Cinnamon-Buff. Posterior element of nose leaves little developed, Type 1 in the classification of Thomas (Ann. & Mag. Nat. Hist., ser. 8, vol. 15, pp. 493-494, 1915); ears moderate in size, smaller than those of *N. geoffroyi* and larger than those of *N. walkeri.* Skull, as compared with that of *N. geoffroyi,* short and broad; rostrum short, broad, and flat; frontal region rising abruptly from rostrum; braincase high and broad. Toothrows widely spaced; upper incisor slender; upper canine with well developed cingulum which is elevated on lingual side of tooth to form a distinct cusplet; third upper molar larger and more complex than in *M. geoffroyi,* metacone and mesostyle well developed, and posterior margin of tooth indented between parastyle and mesostyle (terminology of cusps following Miller, U. S. Nat. Mus. Bull. 57, pp. 30-31, 1907).

Measurements of type specimen.—Head and body 51 mm., tail 43, hind foot with claw 9, ear from notch 21, forearm 37, condylobasal length of skull 14.0, zygomatic breadth 10.0, intertemporal constriction 3.5, mastoid breadth 8.3, upper toothrow C-M^3 5.5.

Specimens examined.—A total of five: the type and two others from Rocky Bay, Cape Arnhem Peninsula (USNM Nos. 284240-42), one from Brocks Creek, about 100 miles south of Darwin (No. 237960), and one from Port Langdon, Groote Eylandt (No. 284239).

Remarks.—In size *Nyctophilus arnhemensis* is intermediate between the two species previously described from the Arnhem Land area: *N. daedalus* Thomas with forearm length 41 to 43 mm., and *N. walkeri* Thomas with forearm 33.5 mm. Thus it falls within the general size range of *N. geoffroyi,* which is widely distributed over more southern parts of Australia, but which differs in essential characters as described above. The resemblance to *N. microtis* of New Guinea is suggestive, and, when comparison of specimens can be made, *arnhemensis* may prove to be a paler subspecies of that generally dark-colored bat.

The single specimen from Groote Eylandt stands out from the others in having a more robust skull and a more flattened rostrum, thus carrying the differences that distinguish *N. arnhemensis* from *N. geoffroyi* to an extreme. In other characters it does not appear to differ from the mainland specimens of *arnhemensis.*

Family MOLOSSIDAE

Tadarida loriae cobourgiana, new subspecies

Type specimen.—U. S. National Museum, No. 284243; female adult, skin and skull; collected September 25, 1948, by D. H. Johnson (field no. 5846).

Type locality.—Black Rock Point (on north shore of Van Diemen Gulf, 15 miles southeast of Cape Don lighthouse), Cobourg Peninsula, Northern Territory, Australia (lat. 11° 26′ S., long. 131° 56′ E.).

Diagnosis.—A small molossid bat of the group that includes *Tadarida loriae* Thomas of eastern New Guinea and *Tadarida norfolkensis* Gray of southeastern Australia. Distinguished from *T. l. loriae* by dark rather than white underparts. Allied to *loriae* and distinguished from *norfolkensis* by unflattened skull and large lower premolar teeth.

Description.—Color of fur on back between Snuff Brown and Sayal Brown; individual hairs whitish at base and intermixed with scattered white hairs; belly slightly paler than back, hairs paler at tips; throat approaching Pinkish Buff; small patch below ear nearly white. Color of skin on face, ears, wing and tail membranes, and feet brown; posterior border of wing membrane narrowly edged with white from third finger to tarsus. Bristly hairs on outer margins of first and fifth toes appearing whitish in contrast to dark-colored feet.

Skull (occipital region missing) slightly smaller than in *Tadarida loriae,* larger and less flattened than in *T. norfolkensis.* Dorsal profile nearly straight; sagittal crest barely perceptible in parietal region, rising abruptly at point of junction with lambdoidal crests to form a low supraoccipital protuberance. Crowns of upper canine and posterior premolar teeth almost in contact, their outer margins forming an angular recess occupied by anterior premolar; anterior lower premolar similar in shape to, and only slightly smaller than, posterior lower premolar; two pairs of lower incisors.

Measurements.—Type specimen (followed in parentheses by measurements of a female paratype of *T. loriae* from Papua, USNM No. 142550, in alcohol): Head and body 53 (53); tail 36 (28); hind foot with claw 8.5 (8); ear from notch 14 (13); forearm 34 (33); length of skull from anteriormost projections of premaxillaries to summit of supraoccipital protuberance 14.7 (14.9); length of palate in midline 5.9 (6.3); breadth across maxillary protuberances, above M^1, 6.4 (6.4); intertemporal breadth 3.8 (4.0); upper toothrow, C-M^3, 6.0 (6.2); lower toothrow, C-M_3, 6.4 (6.7).

Remarks.—*Tadarida loriae cobourgiana* is known only from the type specimen. The dark wings and underparts readily distinguish it from *T. l. loriae,* in which those parts are white. Cranial characters, especially the large and relatively unflattened skull and the large size of the anterior lower premolar, ally *cobourgiana* with *loriae* rather than with *norfolkensis.* The three specimens from Helenvale, Queensland, referred by Tate (Bull. Amer. Mus. Nat. Hist., vol. 98, p. 604; 1952) to *T. l. loriae* are appreciably darker in dorsal color than the type of *cobourgiana.* In color of the upper parts, but not in other characters, *cobourgiana* is intermediate between *loriae* and *norfolkensis.*

All the small Australasian bats of this group may eventually be shown to represent a single species, a possibility that has been anticipated by Laurie and Hill (List of Land Mammals of New Guinea . . . , p. 63, 1954) in their treatment of the Papuan form, but the material now available is divisible into distinct northern and southern types which have not been shown to intergrade.

Order RODENTIA

Family MURIDAE

Notomys carpentarius, new species

Type specimen.—U. S. National Museum, No. 284353; female adult, skin and skull; collected June 8, 1948, by D. H. Johnson (field no. 5525).

Type locality.—Umbakumba, Port Langdon, northeastern corner of Groote Eylandt, Northern Territory, Australia (lat. 13° 51′ S., long. 136° 45′ E.).

Diagnosis.—A medium-sized, pale-colored *Notomys* with opisthodont incisors and a well defined glandular throat patch; resembling *N. alexis* but with longer hind feet, longer tail, pure white rather than gray-based underparts, narrower skull, longer nasals, and larger molar teeth.

Description.—Color above Light Ochraceous-Buff, more or less darkened by blackish hair tips, approaching Clay Color in midback; underparts white, hairs white to base except toward flanks where they are gray-based; face paler than back; tail sparsely haired and weakly bicolored for most of its length, pencilled and more distinctly bicolored at tip; glandular area on throat well marked in both sexes, more extensive in males than in females. Skull with narrow braincase and broad frontal region; nasals long, extending well beyond incisors.

Measurements of type specimen.—Head and body 112 mm., tail 173, hind foot with claw 139, ear from notch 20; greatest length of skull 31.3, condylobasal length 27.6, anterior zygomatic breadth 16.1, posterior zygomatic breadth 15.1, interorbital breadth 5.5, breadth of braincase above auditory meati 12.3, depth of braincase 9.9, length of nasals 12.0, length of anterior palatine foramina 6.0, length of upper molar row 5.9.

Speciments examined.—A total of thirteen from the type locality (USNM Nos. 284350-62).

Remarks.—Hopping mice of the genus *Notomys* are desert animals characteristic of the arid interior of Australia. Their presence on the comparatively humid Groote Eylandt in the Gulf of Carpentaria was quite unsuspected until these specimens were collected. A suitable habitat for this sand-loving rodent is provided by extensive dunes and sandy flats that cover most of the northeastern part of the island.

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